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DEVOTED TO OWNERS OF NEW AND USED CARS DEALERS AND REPAIRERS

VOL. LXVI. PAWTUCKET, R. I., AUGUST, 1918. NO. 1.



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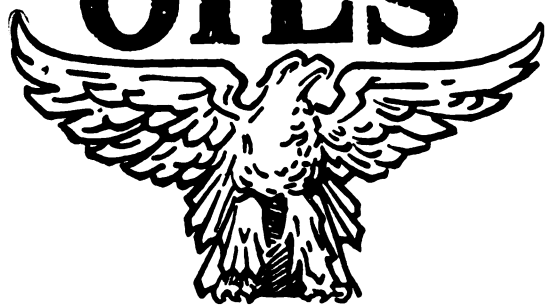
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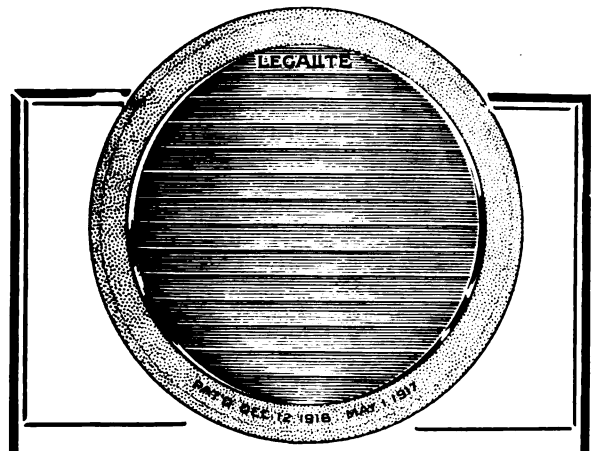
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THE period of "watchful waiting" has passed so far as assuming a stand on the war is concerned, but this attitude is the most appropriate one to adopt at present toward the automobile situation and should be the slogan of every motorist, automobile distributor and accessory dealer. There are all kinds of rumors afloat regarding the outlook for the passenger car, tire and accessory supplies, and these all emanate from thoughtless people discussing things of which they have no knowledge and for which there is no foundation in fact.

"There is nothing definite in the situation at present and no decisive action has been taken that means the cessation of passenger car production or which threatens the supply of either tires or supplies as yet, and no man actually knows that any such drastic steps are contemplated even. I doubt if such a situation will ever be witnessed in this country, as the industry in the trade is too enormous an economic factor in the general welfare and prosperity of the nation to be smothered without long and careful deliberation of the consequences," said the sales manager of one of the largest car distributing agencies in New England.

In view of these facts it is far better for everyone to assume the attitude of "watchful waiting" than to go about disseminating reports and opinions based solely on ideas gained from patching and piecing together a lot of rumors collected at random. Much harm has already been done by the indiscriminate circulation of stories that passenger car production would be stopped and that there would soon be a shortage in the supply of tires, as the effect of such reports has had the result of raising the prices on these products and disturbing conditions in the trade.

The manufacturers of automobiles and tires have billions of dollars tied up in the industry and their future is at stake and dependent upon the prosperity of their distributing organizations. It is only fair to assume then that any reports vital to their welfare would be carefully watched for by them and carefully examined and analyzed so that they could make an accurate and authoritative statement to the public and trade. Until such information comes direct from these sources it behooves the trade, as well as the public, to cease conjecturing and guessing unless they can render their dreaming harmless by keeping the results to themselves.

At present the best way to serve the country and ones self is by keeping on the job or by shouldering a gun and fighting.

ENGLAND has never been a large producer of motor cars, comparing her output with the American production, and the industry there practically suspended so far as the manufacture of passenger cars is concerned, shortly after the war, but it is understood that through the development of her factories for engine production on a large scale and in other machinery lines the business of making automobiles will take on a decided boom shortly after the war. In fact England is now equipped with plants, machinery, skilled workingmen and women, which combined with necessary factory organizations and adequately capitalized companies, will enable her to meet the world's competition in motor cars on a formidable basis. As a result of these conditions it is also expected that her manufacturers will enter the low priced field on a greater scale than prior to the war, as they will be in a position to undertake quantity production on a profitable basis.

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Automobile Journal Publishing Company

TIMES BUILDING PAWTUCKET, R. I.

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ANNOUNCEMENT TO SUBSCRIBERS

Beginning with this issue the Automobile Journal will issue monthly instead of semi-monthly. The change is necessary to comply with the conservation policy of the government as applied to both materials and labor, there being constantly increasing shortages of both, with no lessening of demand unless instituted by the publisher.

The purpose of the Automobile Journal Publishing Co. is to co-operate with the government to the fullest extent. Patriotism is first in business as well as in public, private or civic life.

In making the change from semi-monthly to monthly the Automobile Journal is also conforming with the tendency of the times, on which publishers are generally agreed,—that practically and ideally the best interests of publisher and subscribers are served.

The readers of the Automobile Journal will benefit in that they will have in each issue a greater number of pages, the character of the contents will be strengthened and improved, and both in editorial quality and volume the value of the publication will be decidedly enhanced. The main object of the publisher has been to afford subscribers the largest measure of satisfaction, and the announced decision was reached only after their interests had been given full consideration, and provision made to give them a better magazine than had ever before been produced.

Automobile Journal Publishing Company

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THE AUTOMOBILE JOURNAL

VOL. LXVI. PAWTUCKET, R. I., AUGUST, 1918. NO. 1.

States Take Action To Suppress The Glaring Headlight Nuisance

Drivers Operating with Plain Lenses Will Soon Find Their Road Strewn with Difficulties—New York, Massachusetts and Connecticut Start Campaign of Prosecutions

THE owner of an automobile with plain head lamps and lenses will soon find his scope of operations very limited and his trips quite expensive, as when driving after dark he will be a violator of the law in most every eastern state.

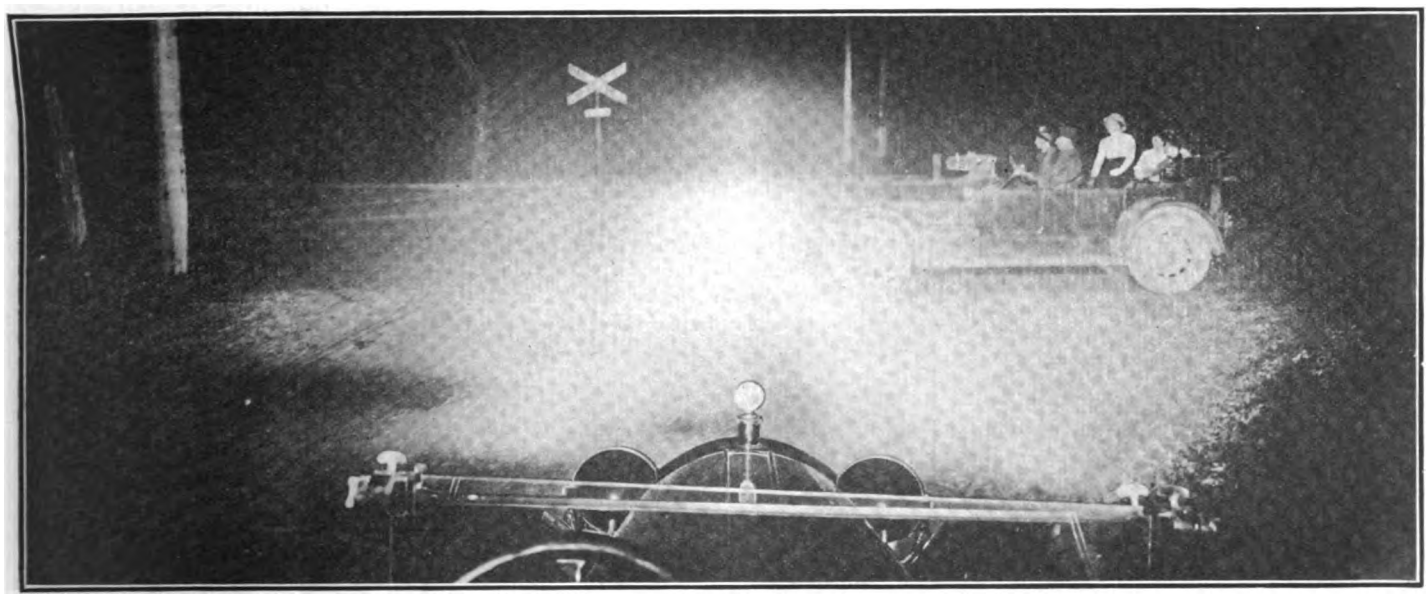
It is becoming apparent to the highway officials and heads of motor car departments of the various states that in the headlight problem lies one of the principal causes of the increasing number of motor car accidents on the highways and they are taking action to eliminate this source of accident by having laws enacted to regulate headlights and are enforcing them.

Every driver of a car must admit of the great danger attending the use of the plain lens in head lamps, for in fact the very complaints of such car operators have instigated the present widespread campaign for head lamp regulation, which has met such popular approval that it will soon bear fruit to an extent that the unregulated headlight will not be tolerated in any state.

Laws to Compel Reform.

Like many situations calling for a public reform conditions bearing upon it have completely reversed themselves, as where formerly there was only a half-hearted demand that the glaring headlight be done away with, there now seems to be a general demand representing the consensus of opinion that no cars be allowed on the road with lights that can blind another driver or pedestrian and it is now taking form in laws that will compel the proper lighting equipment for every car.

Some states have not as yet incorporated in their automobile law any regulatory measures relative to headlights, and the question of whether or not a motorist is to be a dangerous factor on the road is left to his own discretion. He is supposed to exercise the courtesy of not offending other motorists or endangering their lives, but just how he can do this without the proper lighting equipment is not made plain.



Photographic Evidence of the Danger of Glaring Headlights, Driver in Background Is Blinded to View of Railroad Crossing and Gates.

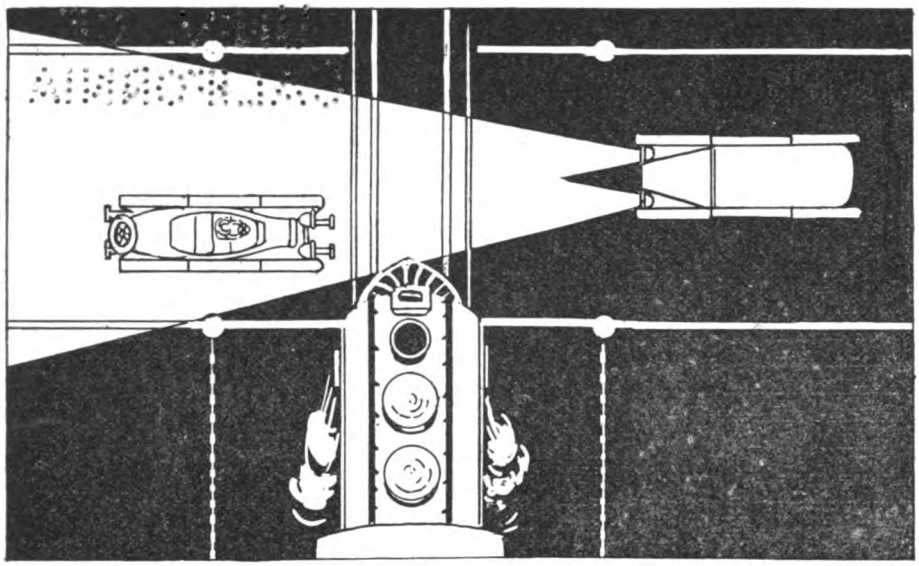
However, motorists of other states are taking the precaution of not letting these motorists become a nuisance on their highways and unless they comply with the laws of the more progressive states they will be obliged to restrict their trips within the confines of their own state boundaries.

Responsibility of Officials.

Practically every state has waived its rights of taxing motorists from other

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At an Ungated Railway Crossing the Blinded Driver Is Unable to See the Dim Lights of the Approaching Locomotive.

states for periods of two weeks to a month and have also shown visiting parties great leniency in the matter of observing the other automobile laws, but it has lately become apparent to those in charge of enforcing the laws that they have no right to permit motorists with dangerous headlights to use their highways to the detriment and danger of motorists who have sought protection against accident in securing the passage of laws to compel the use of head lamps with proper lighting capacity and means of directing the rays in their proper sphere.

Investigation of the matter which has only lately begun on an extensive and thorough scale will probably be productive of many beneficial developments affecting motoring and car owners. In states where owners are compelled to have properly regulated headlights they will certainly be entitled to a lower rate for collision and accident insurance and the careful study of this lighting problem will probably result in the development of a more perfect type of lense or lighting equipment if such a thing is possible, many lenses at present on the market meeting all the requirements of the laws regulating lights while retaining their maximum efficiency for driving purposes.

Massachusetts Takes Action.

In Massachusetts the authorities have again taken cognizance of the lighting problem to the alarming increase in the number of highway accidents, many of which have been directly attributable to improperly regulated automobile head lamps.

For this reason the Massachusetts State Highway Commission has adopted a new rule owing to the numerous accidents and narrow escapes reported from collisions by machines traveling in different directions at night in the suburban and rural sections. This rule is as follows:

"Whenever there is not sufficient light within the limits of the highway location to make all persons, vehicles or substantial objects clearly visible within said limits for a distance of at least 150 feet, the white lights or lights of yellow or amber tint, which a motor vehicle is required to display by section 7, chapter 534, acts of 1909, as amended shall, when said vehicle is in motion throw sufficient light ahead to show any person, vehicle or substantial object upon the roadway straight ahead of the motor vehicle for a distance of at least 150 feet.

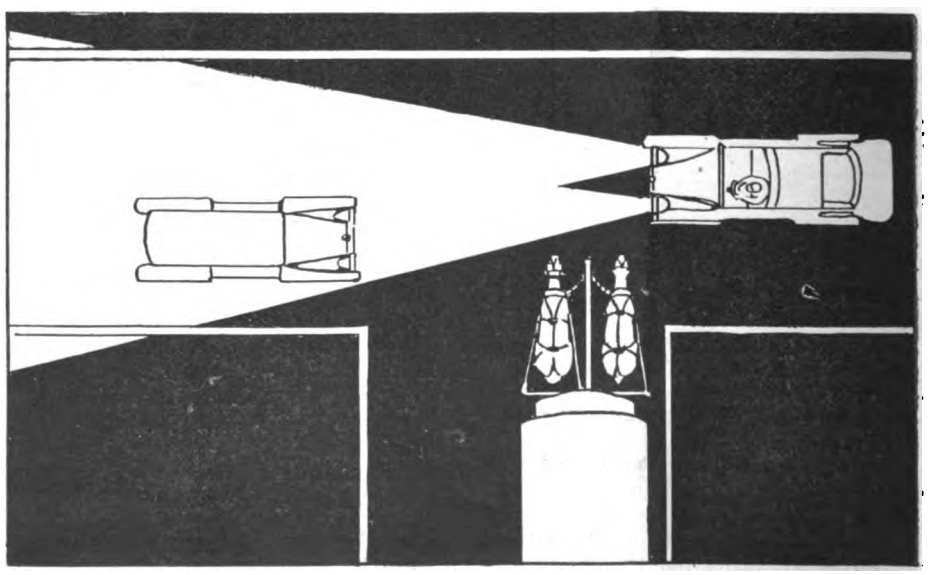
"Any light thrown directly ahead or sidewise shall be so arranged that no dazzling rays from it or from any reflector shall be at any time more than 3½ feet above the ground on a level road at a distance of 50 feet or more ahead of such vehicle, and said light shall be sufficient to enable the operator of the motor vehicle to see any person, vehicle or substantial object upon the roadway or side thereof for 10 feet on each side of the motor vehicle 10 feet ahead of such vehicle.

Col. Sohier of the Massachusetts State Highway Commission recently stated that the police of the various towns and cities were now actively cooperating with the commission in suppressing the illegal use of headlights and that over 80 prosecutions had already been made in the vicinity of Springfield, Mass., alone. With over 175,000 cars registered in that state it is naturally a difficult task to impress upon every operator the necessity of observing this law, and particularly so as in the past the lax attitude on the part of the police toward this regulation has conveyed the impression generally that the headlight regulations were not looked upon as requiring strict observance. To overcome this belief on the part of motorists and to quickly bring them to a realization of the dangerous practise of driving about the country with glaring lamps, Col. Sohier has suggested that people make complaints to the commission, give the number of the cars of offending operators and they will be summonsed.

Rhode Island in Line.

The State Board of Public Roads in Rhode Island, which has the power to make such regulations governing motor car headlights as is deemed necessary without legislative action, is now considering the adoption of some rule regarding the use of head lamps with the object of eliminating the nuisance of glaring headlights. Nothing definite has been decided by the board as yet, but it is understood that any action taken will conform closely to that already in force in Connecticut and Massachusetts, as Rhode Island is hemmed in on both sides by those states and its motorists use their roads extensively, which fact will make it necessary to meet the conditions imposed by the bordering states.

In view of the improved driving conditions that will obtain when the regulated headlight is in use, the trouble or expense incurred by the motorist in effecting it is negligible, as there are many devices already on the market which meet with the provisions of the law and which do not call for a great outlay of money or time or expense for installation.



The Driver, Blinded by the Approaching Lights, Cannot See the Team of Horses Crossing His Path.

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Action in Pennsylvania.

A similar situation has existed in Pennsylvania. The authorities have been empowered with a law to suppress the glaring headlight nuisance, but have been rather lax in making prosecutions until recently, when the superintendent of police of Pittsburgh started a crusade against automobilists with improper headlight equipment and the campaign will be continued, it is understood, until motorists thoroughly understand that the law regulating the limitations of their lights must be observed.

New York Makes Rigid Test.

In New York state the authorities have made extensive tests of head lamps and devices and will soon issue a list of the types approved. The tests under which lights are to be approved in that state are very exhaustive and exact, the conditions to be fulfilled to comply with the intent of the new law being specified for the purposes of testing as follows:

1. Any pair of head lamps under the conditions of use must cast a beam which when measured on a level surface at a distance of 200 feet directly in front of the car and at some point between the level surface and a point 42 inches above this surface, is not less than 1200 apparent candlepower.

2. Any pair of head lamps under the conditions of use shall cast a beam which, when measured at a distance of 100 feet directly in front of the car, and at a height of 60 inches above the level surface, does not exceed 2400 apparent candlepower, nor shall this value be exceeded at a greater height than 60 inches.

3. Any pair of head lamps under the conditions of use shall cast a beam which, when measured at a distance of 100 feet ahead of the car, and seven feet or more to the left of the axis of the same, and at a height 60 inches or more above the level surface, does not exceed 800 apparent candlepower.

Laboratory Test Required.

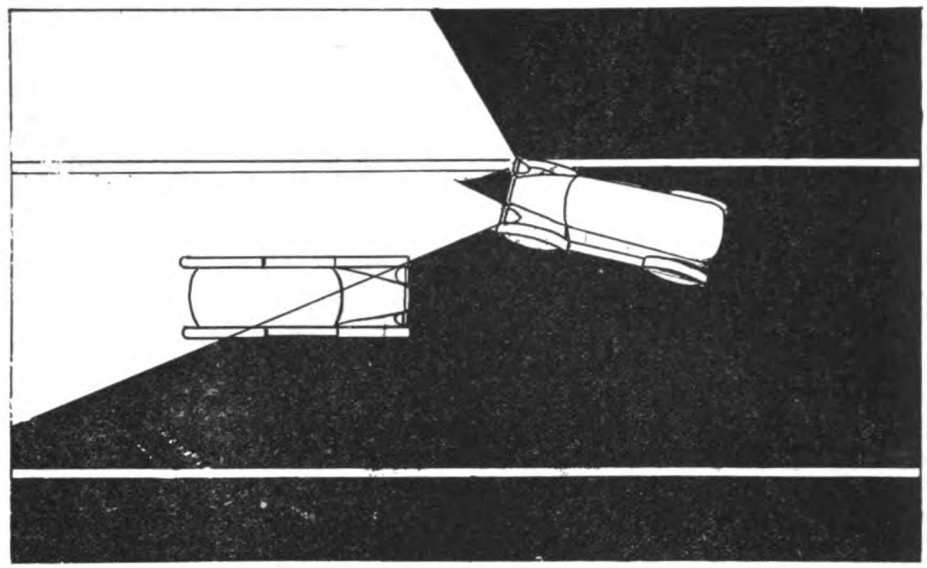
In order to determine whether any particular device conforms to these requirements, it shall be subjected to laboratory tests according to the following specifications:

Two pairs of samples of the device submitted shall be subjected to test. In the case of front glasses the samples shall be of 9¼-inch diameter.

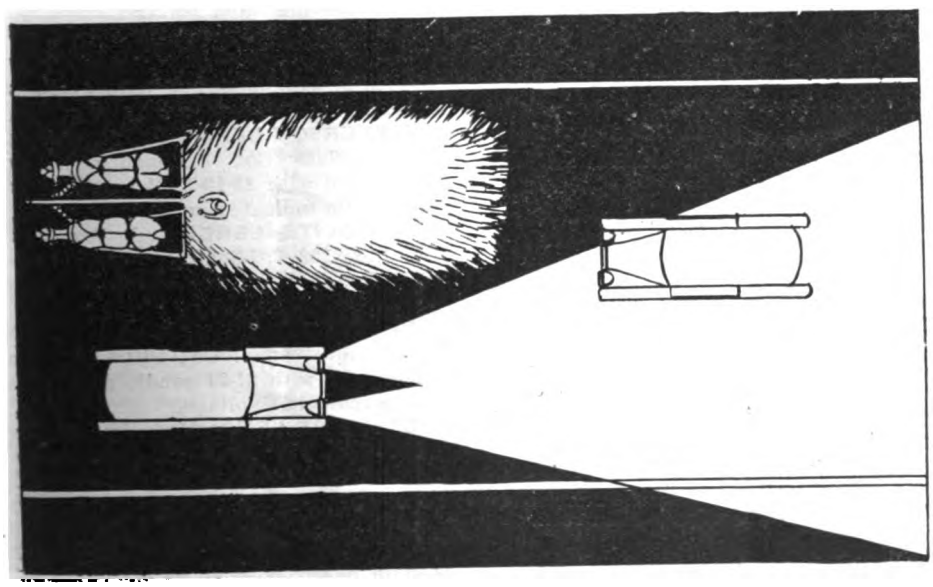
Reflector Requirements.

The reflectors used in connection with the laboratory tests shall be of standard high grade manufacture of 1.25-inch focal length, with clean and highly polished surfaces, and as nearly truly paraboloidal in form as practicable, and as approved for this purpose by the national bureau of standards.

The manufacturer of the device shall be given due notice of the date and place of test. Manufacturers' representatives present at the test shall be privileged to adjust their devices in any way which represents an ordinary and legitimate adjustment, including tilting the lamps or reflectors, which can be carried out by purchasers of the device, or such adjustment may be made by the laboratory expert acting on the instructions of the manufacturer. The character of the adjustment so made shall be carefully noted and stated in the report as manufacturer's adjustment.



A Driver Blinded by Glaring Lights Instinctively Crowds Toward the Light, Forcing the Oncoming Machine Into the Ditch.



One of the Greatest Dangers from Headlight Glare Is of Collision with Slow Moving Vehicles Ahead.

How Tests Are Made.

The tests shall be as follows:

Test 1. Four-point test of pairs of samples.

A pair of testing reflectors, mounted similarly to the head lamps on a car, shall be set up in a dark room at a distance of not less than 60 feet nor more than 100 feet from a vertical white screen. If a testing distance of 100 feet is taken the reflectors shall be set 28 inches apart from center to center and if a shorter testing distance is taken the distance between reflectors shall be proportionately reduced. The axes of the lamps shall be parallel and horizontal, or as tilted in accordance with manufacturer's adjustment. The intensity of the combined beams shall then be measured with each pair of samples in turn, with the reflectors fitted with a pair of each of the following types of incandescent lamps, in turn:

(1) Vacuum type, 6-8 volts, 17 mscp., G-12 bulb.

(2) Gas filled type, 6-8 volts, 20 mscp., G-12 bulb.

The lamps shall be adjusted to give their rated candlepower. Measurements shall be made at the following points at the surface of the screen:

A. In the median vertical plane parallel to the lamp axes, on a level with the lamps.

B. In the same plane one degree of arc below the level of the lamps.

C. In the same plane one degree of arc above the level of the lamps.

D. Four degrees of arc to the left of this plane and one degree of arc above the level.

Specifications of Samples.

In an acceptable device both pairs of samples shall conform to the following specifications for observed apparent candlepower:

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Points A and B. At at least one of these points the apparent candlepower shall not be less than 1200.

Point C. The apparent candlepower shall not exceed 2400.

Point D. The apparent candlepower shall not exceed 800.

Provided, however, that if the test indicates that a device which is unacceptable with either of the test lamps will come within the specifications with lamps of another candlepower or of the other type, the device may be passed with corresponding limitations as to the incandescent lamps to be used in connection with it.

Test 2. Complete test of single sample.

A single sample taken as an average representative of the device as manufactured, shall be submitted to a complete test with a vacuum incandescent lamp of 17 candlepower 6-8 volt rating in a G-12 bulb. This test shall show its beam characteristics by actual measurements made according to recognized and exact methods.

One pair of the samples submitted shall be retained by the testing laboratory for purpose of future reference and as samples of construction, and the other pair shall be returned to the office of the secretary of state.

Report on Result of Test.

The report of the tests shall be rendered in duplicate to the secretary of state, and shall be signed or initialed not only by the expert making the test, but also by a person representing the more general responsibility of the institution making the test. It shall include a statement by the testing laboratory as to whether the device has passed or has not passed the specifications as herein given; also, a statement as to the maximum or minimum candlepower to be used with the same and as to the other conditions necessary in the operation of the device in such a way that it will comply with the requirements of this specification.

Connecticut's New Law.

Connecticut has had a new headlight law for some time, but did not strictly enforce its provision on visiting motorists until recently, when notices were sent to the motor car or highway department heads of the various surrounding states of the intention of the state commissioner to enforce the law on all motorists using the highways of Connecticut.

The motorist to escape prosecution in Connecticut must see that the headlights of his car meet the following provisions:

"Give 150 feet of driving light. Throw no dazzling rays or beams of reflected light ahead of the car higher than 42 inches at a point 75 feet ahead of the vehicle. Give light 10 feet to each side at a point 10 feet ahead of the car."

The pamphlet which was sent out by the Connecticut Commissioner of Motor Vehicles contained the name of about 25 kinds of head lamp reflectors, lenses and devices which are approved by the authorities of that state.

Following is a list of approved devices issued by the department of motor vehicles of Connecticut:

BARTELSTONE LENSES—Made by Bartelstone Co., Inc., 1170 Broadway, New York, when used with 21-24-30-36-40 candle power bulb at its indicated voltage.

BERMAC REFLECTOR—Made by W. H. Berry, 31 State street, Boston, Mass., when used with a 24 candle power bulb at its indicated voltage.

CORNING CLEAR LENS—Made by Corning Glass Works, Corning, N. Y., when used with a 21 candle power bulb at its indicated voltage.

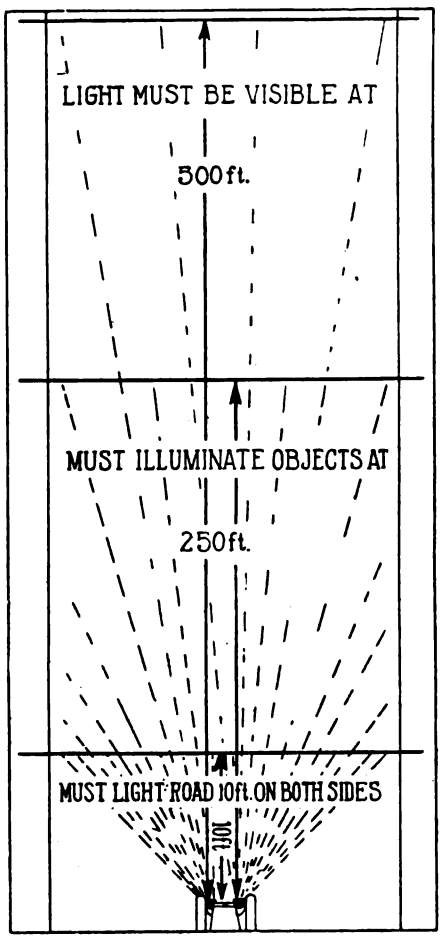


Diagram of Light Projections. Meeting Maximum Limitations of Every State.

CORNING NOVIOL LENS—Made by Corning Glass Works, Corning, N. Y., when used with a 21 candle power bulb at its indicated voltage.

CONTROLITE LENS—Made by Super-Lighting Co., 1834 Broadway, New York, when used with a 21 candle power bulb at its indicated voltage.

FRACTOR LENS—Made by Crew Levick Co., Land Title Building, Philadelphia, when used with 15-18-24-36 candle power bulb at its indicated voltage.

HOLOPHANE LENS—Made by Holophane Glass Co., 340 Madison avenue, New York, when used with 12-15-18-21 candle power bulb at its indicated voltage.

HOTCHKISS LENS—Made by Hotchkiss Co., Torrington, Conn., when used with 40 candle power bulb at its indicated voltage.

MASK AND LIGHT CONCENTRATION—Made by Hamilton & De Loss, 745 Main street, Bridgeport, when used with 18 candle power bulb at its indicated voltage.

LEGALITE LENS—Made by the Legalite Corporation, Boston, Mass., when used with 15-18-24-36 candle power bulb at its indicated voltage.

MORE-LIGHT LENS (Amber)—Made by L. E. Smith Glass Co., Mt. Pleasant, Pa., when used with 21 candle power bulb at its indicated voltage.

MORE-LIGHT LENS (Clear)—Made by L. E. Smith Glass Co., Mt. Pleasant, Pa., when used with a 21 candle power bulb at its indicated voltage.

OFFSET REFLECTOR—Made by C. T. Sutterley & Co., 237 Hamilton street, Philadelphia, when used with a 21 candle power bulb at its indicated voltage.

OSGOOD LENS—Made by Osgood Lens and Supply Co., 1241 S. Michigan avenue, Chicago, when used with a 24 candle power bulb at its indicated voltage.

QUEEN CUT GLASS—Made by Flemington Cut Glass Co., Flemington, N. J., when used with a 15 candle power bulb at its indicated voltage.

REFLECTOR—Made by the Rand Reflector Co., Haverhill, Mass., when used with a 21 candle power bulb at its indicated voltage.

SAFERLITE LENS—Made by the Saferlite Co., 220 Fifth avenue, New York, when used with a 24 candle power bulb at its indicated voltage.

VICTORIA SIMPLEX—Made by the Victoria Manufacturing Co., 12-16 John street, New York, when used with 15-18-21-24 candle power bulb at its indicated voltage.

WARNER LENS—Made by the Warner Lens Co., 914 S. Michigan avenue, Chicago, when used with 15-21 candle power bulb at its indicated voltage.

MACBETH LENS—Made by the MacBeth-Evans Glass Co., Boston, Mass., when used with 15-18-21-24 candle power bulb at its indicated voltage.

McKEE LENS—Made by the McKee Glass Co., Jeanette, Pa., when used with 15-18-21-24 candle power bulb at its indicated voltage.

JEFFERSON LENS—Made by the Jefferson Glass Co., Fallonsbee, W. Va., when used with 15-18-21-24 candle power bulb at its indicated voltage.

PRIMOLITE LENS—Made by Barry Co., Ltd., 122 S. Michigan avenue, Chicago, when used with 15-18-21-24 candle power bulb at its indicated voltage.

NOGLARE AUTO LENS—Made by Noglare Auto Lens Co., Pittsburgh, Pa., when used with 21-24 candle power bulb at its indicated voltage.

STEWART LENS—Made by the Stewart-Warner Speedometer Corporation, Chicago, when used with 15-18-21-24 candle power bulb at its indicated voltage.

SHALER LENS—Made by the Shaler Lens Co., when used with 15-18-21-24 candle power bulb at its indicated voltage.

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Handling Used Cars By Systematic Methods

Carefully Worked Out Plan of Inspection and Appraisal Enables Bishop, McCormick & Bishop, Inc., To Place Arbitrary Price On Cars Offered In Trade That Is In Keeping With Sound Business Policy

BISHOP, McCORMICK & BISHOP, INC., Brooklyn, N. Y., distributors of Dodge Brothers cars on Long Island, have worked out methods of handling used cars which seem to incorporate the essentials that are necessary to place this end of the automobile dealers' business on a sound basis. The whole secret of this plan is practically contained in the appraisal, the details of which is shown in the accompanying form (Fig. 1), and which includes all the necessary items to be checked in arriving at a fair value for a used car.

Their method of appraising the value of a used Dodge car is to establish, first of all, the resale value of used Dodge cars of different serial numbers. These serial numbers usually follow very closely any radical changes or improvements that have been made to the car since it was first offered to the public. They have found, from experience, that a system of this kind is necessary in view of the fact that Dodge Brothers do not manufacture a yearly model of series; and while they set the general principle that any used Dodge car, in good condition, is worth as much as any other used Dodge car in the same condition, nevertheless, they recognize the fact that the general trade is influenced to a degree by changes in style and construction, and that is their only reason for the adoption of these serial number divisions.

Having established the price at which the car shall be sold, and having established, through their records of past years, the average selling cost, the average advertising cost, the average selling expense (based on salaries or commissions paid) and the average storage expense per car, they are then in a position to tell very closely what their total sales cost will be on the car. Then they have the used car tested by their service department, to find out what their standard charge will be for putting the car in good running condition. Having found out what this charge will be they deduct from the sales price what they know they can get for the car, the sales cost, repair cost and the margin of at least $25 for contingencies. The amount left after these deductions have been made is the allowance given to the customer.

It is quite apparent how valuable their standard practise repair system is in handling used cars. If their repair department sets the cost of $50 to put the car in condition, they know that the charge will not exceed $50, and there is no element of uncertainty in this charge, as there likely would be if only an estimate of the cost of overhaul were given. Since they have made it a practise for the service department to charge every other department the same rates for work, which are charged to the retail customers, there is no likelihood of this work being slighted in any respect by the service department, and the used car department has the same "comeback" on the service department if the work is not properly done, which a retail customer would have.

The form shown in Fig. 2 shows the general condition of the car in detail when its value was appraised. This form is printed on a card and is used where a customer receives an appraisal on his car, but wishes to continue to use it until his new car is delivered to him. The careful checking over of all the items on this card makes it absolutely certain that the car will be turned in in the same condition as when appraisal was made.

The used car record sheet (Fig. 3) permits of a complete and definite record being kept of all the expense items that entered into the sale of any particular used car, so that it is absolutely certain at the start that a car will not be sold except at a price that will cover all the items of expense plus a small margin of

A COPY OF THIS FORM TO BE USED FOR EVERY CAR TAKEN IN TRADE

BISHOP, McCORMICK & BISHOP, INC. No._____

USED CAR COST TALLY

Car Received _____ 191_

BOUGHT FROM	ADDRESS	MAKE	STYLE
SALESMAN	MOTOR No.	CAR No.	LICENSE No.

In exchange for _____ car at $_____

Appraised by _____ at $_____

CHARGES

1. Trade allowance	$	
2. Painting		
3. Tools to make up equipment		
4. Tires and Tubes. (New, repaired or second-hand)		
5. Supplies		
6. Battery Repairs		
7. Upholsterer Repairs		
8. Repair Job No. _____ Nature		
9. Repair Job No. _____ Nature		
10. Repair Job No. _____ Nature		

OVERHEAD OR INDIRECT COSTS

1. Insurance		
2. Labor—Department Repair Men (includes general repair, demonstrations and lessons)		
3. Department Salaries		
4. Advertising		
5. Rent, Light, Heat		
Total Charges		$

CREDITS

Agreed difference, if any, between allowance and appraisal made by	$	
Extra Equipment { Sold / In Stock		
Rental		
Sold to		
Total Credits		$
Loss or Gain		$

Paid by Cash _____ Trade _____ Notes _____

Inventoried _____ at _____

Inventoried _____ at _____

Inventoried _____ at _____

Fig. 1—Used Car Appraisal Form.

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Know The Facts And The Truth

The Golden Rule of
CLIFFORD M. BISHOP,
General Manager
Bishop, McCormick & Bishop, Inc.



CLIFFORD M. BISHOP.

If the desire is to build up a business, not a "game," it is essential that a dealer should establish certain principles and practises for his business, and that he should gather about him men of honesty and character, who will carry out these principles and practises.

Not very long ago it was generally thought necessary to have a service manager who was slippery and had the ability to "jolly" and "get by" with the customers. Most of us have now found that anyone who can "get by" with the customers can quite likely "get by" with the boss, and, therefore, the introduction of men of this type into a business is quite certain to ruin its business character.

We have found that it is essential to know the truth and to face it; so we have never made it a practise to severely criticise anyone who has made a mistake, provided he tells the truth about it. Knowing the real facts is half the battle in being fair to yourself and your customers. Therefore, there should be no place in any organization for a liar.

I think the average dealer is likely to make the mistake of treating his business as a cheap business, in the sense that it is not able to support sufficient men of good character and ability at satisfactory salaries. If a dealer believes he is engaged in a restricted business, then his case is truly hopeless, for I sincerely believe that there is no piece of territory of any size that has a definite and fixed limit of sales for any particular make of standard automobile, especially in the low and medium priced classes. Therefore, it is ridiculous for any sales agency to figure that its sales possibility will not permit of its employing men big enough and broad enough to get the biggest possible returns in the right way from the territory covered. There is always a definite, proper and certain profit from the intelligent use of the right kind of man power.

It is also the firm conviction of our organization that every major department of a business should be a paying department. Sales can unquestionably pay, service can be made to pay well and will pay increasing returns as time goes on; the parts department cannot help but be profitable, and even the used car department can at least pay its way. This is all, of course, predicated on the fact that there must be a man at head of each department capable of handling it.

A business based on character is surprisingly easy to systematize. The practise in each department can be standardized and sufficient leeway can be given to each executive to insure that the man responsible for the direction of the entire business is not spending nine-tenths of his time on the petty details of the business. In other words, the clear establishment of authority and responsibility should leave some one in the business free of petty worries to think about it as a whole and to prepare for any future conditions that the business is likely to meet. This man will give very little thought to the present; his thinking will be aimed a month, two months, or even three months ahead, and, in this way, he will guide the business so as avoid the shoals and reefs.

Clifford M. Bishop.

profit. Consequently, if each transaction is a profit, it is reasonable to assume that the total results of the department will net a profit.

Another form of their system illustrated (Fig. 4) is a card index that enables them to keep a record of their used car stock. It contains a recapitulation of all the essential details and is the final analysis of the used car stock taken from the other records.

Used Car Customer Receives Same Treatment.

Bishop, McCormick & Bishop, Inc., admit that their used car system would not work quite so well with used cars of other makes that they have to take in on the trading basis, but they also contend that these cars cannot be sold on the same basis that they sell used Dodge cars; therefore, the same principles will not apply to used cars of other makes.

In handling of used cars of other makes they do not undertake to repair them. They will make minor adjustments and these are generally made by two or three mechanics who are permanently attached to the used car department. They will clean the cars and even paint them, but they are invariably sold "as is." Their allowances on used cars of other makes are much lower than the owners could receive by taking them back to the agency from whom they purchased them. They have found that the quality of the Dodge car as maintained by the efficiency of their service department, has placed them in a position to secure used car business on a basis that makes each transaction profitable, although their allowance figures are invariably lower than those of their competitors.

They never sell a used Dodge car until it has been placed in excellent mechanical condition, and they never sell except at a price that bears exceedingly close relation to their new car price. Through the purchase of a used car from them the customer receives exactly the same treatment and the same facilities from their organization and plant as he would if he purchased a new car. He receives the complete driving course, has the privilege of taking the course on care and maintenance in the school, and he receives the same attention from the service department.

Their guarantee on used cars is liberal and includes the following points: 1—We guarantee that the value of each car is accurately represented by the price quoted. 2—That the condition of each car is exactly as represented. 3—That we will make minor adjustments which may be necessary, without charge, for a period of 30 days after delivery. 4—That we will take back any car within 30 days from date of delivery, at its sale price, minus a reasonable charge for use, in exchange for another used car or in part payment of a new car. Aside from the advantages of their educational department, they offer to purchasers of used cars free inspections, free advice and their flat rate charges for work. They also sell used cars on the easy deferred payment plan if desired.

A Side Street Advertised Into Prominence.

Their used car sales room is entirely separate from their new car sales room, being located at 1243 Fulton street. Although this is one of the most prominent business streets in Brooklyn, unavoidable circumstances compelled them to locate their main offices and new car sales room at 20 Halsey street. Here is a contrast of a less prominent location

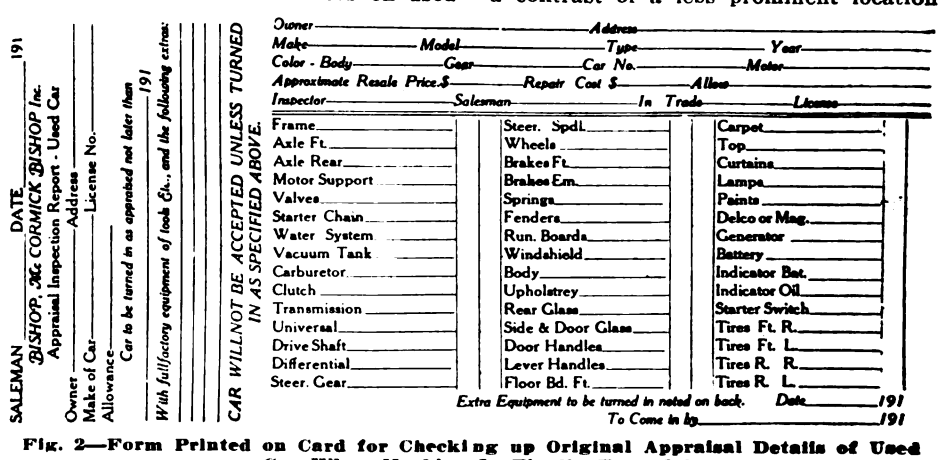


Fig. 2—Form Printed on Card for Checking up Original Appraisal Details of Used Car When Machine Is Finally Turned in.

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being well advertised and a more prominent location only advertised as the background of their business. This is not a strange phenomenon. It simply exemplifies the fact that good advertising made prominent even a remote location. At the front of their business on the side street is continually a scene of great activity. Advertising created it.

Mr. Clifford M. Bishop says in regard to their location: "Brooklyn has no main automobile street. Bedford avenue comes nearest to it today, but the opinion is not unanimous that it should be the automobile street; therefore, there has not been any central market place. Because in the earlier days a garage was thought exceedingly profitable, chance located us on Halsey street, off Bedford avenue, where there was a large interior lot available for the establishment of a garage. This chance location introduced two factors into our business which have had a great deal to do with its success: The first is, that being off the main street we could not very well afford to wait for our business to come to us, and so from the very beginning we learned to go to our business. The other factor resulted from the discovery that a garage was not at all the kind of business that we wanted to conduct, and, as our sales business grew, we eliminated the garage and established a service station, so that we wound up with our whole plant in a unit at a relatively low overhead expense."

BISHOP, McCORMICK & BISHOP, INC.

No.....

USED CAR STOCK.

Make .....
Type .....
Model .....
H. P. .....
Car No. .....
Motor No. .....
License No. .....
Checked in by .....
Remarks: .....
Rec'd ..... 191....
From .....
Address .....
Telephone .....
Trade For .....
Salesman .....
Price .....
Checked out by .....
.....
.....
.....
.....

Fig. 4—Card Index of Used Car Stock.

BISHOP, McCORMICK & BISHOP, INC.
BROOKLYN, N. Y.

CAR RECORD

Date Received ..... Trans. .....
Car. No. ..... Model ..... Motor No. .....
Owner ..... Date Delivered .....
Address ..... Telephone No. .....

DATE	Rec. No. REC. NAME	SALES EXPENSE	AMOUNT	DATE	R—No.	CHARGE	MILEAGE	AMOUNT

DATE	TESTOR	TESTS MILEAGE	NATURE OF WORK

Fig. 3—Record Form Covering Complete Costs of Handling a Used Car.

Commercial Car and Truck Department.

As the territory controlled by Bishop, McCormick & Bishop, Inc., is located on an island, there was no chance for their having their territory for the sales of passenger cars extended. The reduction of the production of passenger cars, which considerably reduced their allotment for this year, compelled them to devise ways and means by which they could create a new branch of their business and thus be able to fill in the gap that the shortage of passenger cars had created.

They reviewed the situation that confronted them along these lines of analysis: They assumed, by way of comparison, that the normal sales possibilities of their territory were 1000 cars. Since their territory is located on an island it is not practical that their territory could easily be extended, nor is it likely that Dodge Brothers would allot any larger territory. The vital question to answer satisfactorily was: "What can we do to increase our business?" Their answer was to enter the commercial car field, and it was much more practical and easier for them to enter this field because they are large distributors of a one-car line, which enabled them to standardize their commercial vehicles on the basis of the Dodge chassis. Adopting and considerably concentrating a portion of their plant and organization on the commercial vehicle was practically the same as having an extension of their territory granted them. They contended that having a territory wherein the public is impressed with the quality of their passenger cars to acquire 1000 of them, it was reasonable to suppose that with the proper push and energy they could also sell 1000 commercial cars in the same territory without increasing their overhead expense to any extent. Here is where they were enabled to use their mechanical engineer, whose services had previously been used almost exclusively in their educational department, as instructor. Therefore it was a natural step to develop an engineering department, which they have found necessary and very conducive to the proper development of their commercial car line.

Dodge Brothers were already producing a commercial chassis of 1000 pounds capacity. With this unit as a starter and with the adaptation of the principle so clearly shown by the locomotive, of towing the load instead of carrying it, it was quite simple for Bishop, McCormick & Bishop, Inc., to develop a wide range of commercial models. There were two ways of doing it: One was by lengthening the commercial chassis so that it would take bodies the type of their undertaker's job and their ambulance, which do not usually carry loads of over 1000 pounds; and the other method, to develop heavy duty trucks by using Dodge Brothers' commercial chassis as the front or towing member and introducing a high class rear axle and truck frame for the truck part of the chassis. By balancing the load over the rear axle no additional burden was added to the front axle and the result was a remarkably serviceable, highly efficient and economical truck.

The engineering principle involved in their design of the extension of the Dodge chassis is exactly the same as that employed in balancing the load in a one-horse dumping cart. The load is balanced over the two wheels and the shafts rest lightly on the horse. The tractor and trailer construction is similar to the ordinary four-wheeled truck. By arranging the position of the rear wheel on the trailers they put 60 per cent. of the load on the rear axle and 40 per cent. on the front, which, in the case of a trailer, is the rear axle of the tractor, practically no load at all on the front end of the tractor. The construction of the tractor and truck are identical except that the tractor is a shorter wheel base in order to secure a shorter turning radius. By thus balancing of the load they have made the deduction that a 1½-ton axle could be used on a three-ton tractor and a 2½-ton axle is perfectly suited to a five-ton tractor.

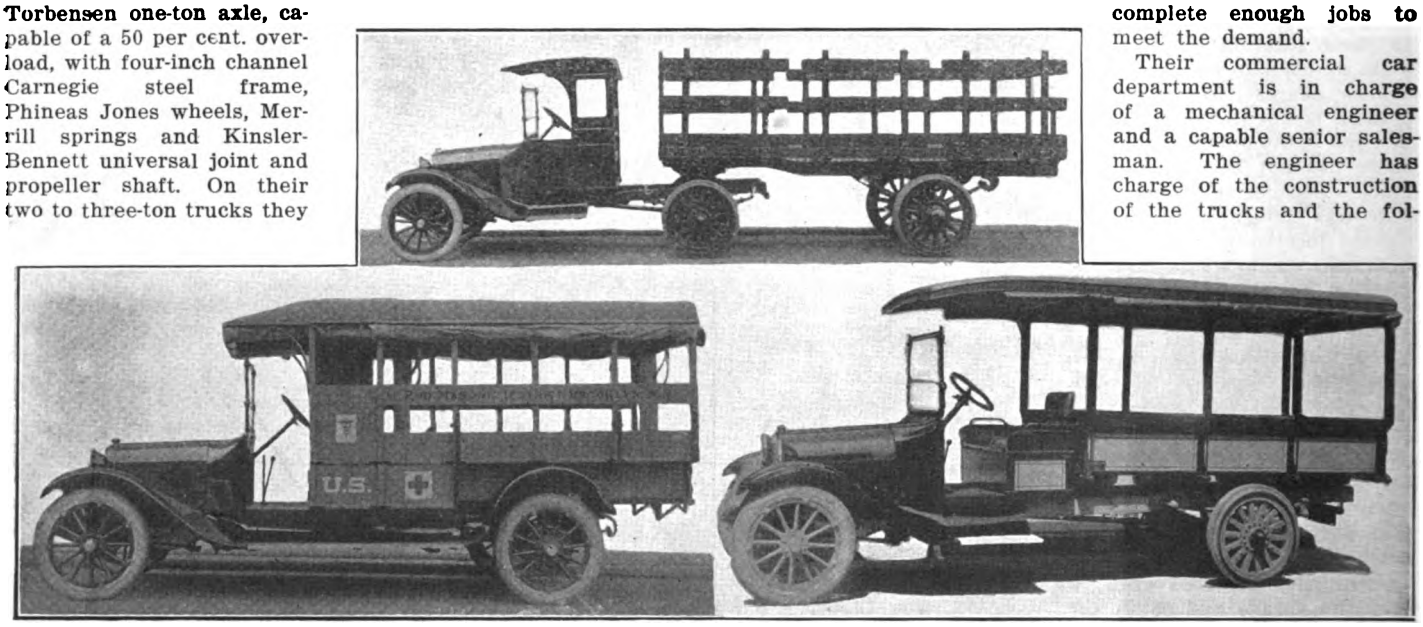
Types of Commercial Cars Developed.

They have developed the following types of commercial cars: One-half-ton truck, three and five-ton tractors, ambu-

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lances, taxicabs, combination hearse and casket car, hearse, seven-passenger funeral car, dumping coal truck, 10 different types of panel body jobs on the standard commercial chassis and 10 different types of truck bodies. All their various types of bodies are built under their own designs and directions.

On their 1½-ton truck they use the Torbensen one-ton axle, capable of a 50 per cent. overload, with four-inch channel Carnegie steel frame, Phineas Jones wheels, Merrill springs and Kinsler-Bennett universal joint and propeller shaft. On their two to three-ton trucks they use the two-ton Torbensen axle, capable of a 50 per cent. overload, with five-inch channel Carnegie steel frame, and the same makes of other parts, except of heavier construction.



Top View, Dodge Tractor and Bishop-Mc Cormick Trailer; at the Left, Ambulance on Extended Dodge Chassis; at Right, Dodge-Bishop-McCormick One-ton Truck.

The standard wheelbase of their 1½-ton and three-ton trucks is 135 inches. This will accommodate a body with 9 to 10 feet of loading space back of the driver's seat. In cases where the purchaser desires more loading space they furnish a truck chassis with a wheelbase up to 160 inches. On this size chassis they use a split propeller shaft with self-centering bearing. The object of the split propeller shaft is to overcome any whip that would develop in an unusually long propeller shaft. On the tractors they use the same construction for the five-ton tractor that they use on the 1½-ton truck, except that the wheelbase is 110 inches, and the same construction for the five-ton tractor as the three-ton truck, with a 110-inch wheelbase. They also use the Martin rocking fifth wheel. The gear ratio on the 1½-ton truck and the three-ton tractor is eight to one and on the two to three-ton truck and the five-ton tractor the gear ratio is 9 to 1.

When a purchaser wishes to use his old horse drawn truck as a trailer they have found it necessary, in some cases, to lengthen the wheelbase of the tractor to give room for the extra wide body to clear the cab of the tractor when making a complete right angle turn, such as in the case where the trailer is backed up and the tractor is turned at right angle to the trailer, so as not to occupy too much of the street.

Their method of attaching the truck unit to the Dodge chassis is different from that used by the majority of the attachment companies. They have the truck frame made the same width as the Dodge frame and then spring the Dodge frame inside the frame of the truck attachment and hot rivet the frames together, thereby adding strength to the construction. Their truck and tractor attachments have been made locally under their own supervision, but they are now using large quantities of Graham Brothers units as standardized for Dodge Brothers commercial cars.

On their ambulance jobs they lengthen the Dodge standard commercial chassis to 138 inches and on the combination hearse and casket car the wheelbase is extended to 144 inches.

When Bishop, McCormick & Bishop, Inc., started to develop their commercial car line, a number of people told them that it could not be done. However, a great majority of Dodge owners whose faith in the performance of the passenger car was sufficient to prove to them that it would make an efficient truck or tractor, encouraged them to proceed with the development of their commercial car line. The result of this development is that, even under the present adverse conditions they have not been able to complete enough jobs to meet the demand.

Their commercial car department is in charge of a mechanical engineer and a capable senior salesman. The engineer has charge of the construction of the trucks and the following up of special body work with the different body companies. He takes charge of the truck inspection service and directs the school for both the passenger car and truck operators, besides is at the service of any of the salesmen for consultation with prospective customers, advising them how to solve their trucking problems.

The volume of their commercial car business each month is approximately 25 per cent. of their total retail sales. Their associate dealers also attain excellent results in selling commercial cars.



Section of Commercial Car Department.

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Car Makers to Take on 100 Per Cent. War Work

War Industries Board Says This Schedule Should Be In Force Not Later Than Jan. 1, 1919—Little Material For Passenger Cars Available After That Date

The uncertainty that has enshrouded the outlook for the passenger automobile for the past year is apparently cleared up by the latest announcement of the War Industries Board that is interpreted to mean that after Jan. 1, 1919, the motor car manufacturers must be in a position to do 100 per cent. war work and that such a situation would automatically cut off the production of automobiles to a large extent.

The letter in which this statement was made was adressed to the National Automobile Chamber of Commerce and was in response to the proposal made to the board on the part of Hugh Chalmers in behalf of the organization of car manufacturers. Mr. Chalmers gave the board the proposal of the manufacturers to cut production 50 per cent. of their 1917 rate, which was decided upon at a recent meeting of the directors of the N. A. C. C. held in Detroit.

The whole situation as the government views it is summarized in the letter of the War Industries Board, which is as follows:

"We are in receipt of and have given very careful consideration to your communication of Aug. 8, embodying the resolution passed at your meeting at Detroit, Tuesday, Aug. 6. We note that the manufacturers have voluntarily agreed among themselves to curtail the production of passenger cars 50 per cent. While this is clearly a step in the right direction and furnishes a basis for each and all of the manufacturers without further delay to make appropriate reductions in selling, general and overhead expenses, still it is only a step, and further curtailment is inevitable.

"Fairness to your industry impels us to frankly state that the situation as it is presented to us today indicates very clearly that there will be little, if any, of the principal materials required in the construction of passenger cars available for non-war industries after the war requirements shall have been provided for, and the war industries board cannot at this time make any promise whatsoever regarding the supply to your industry of steel, rubber or other materials for any definite period in advance.

"We strongly believe that it is to the best interest of your manufacturers and all other manufacturers of passenger automobiles to undertake to get on 100 per cent. war work as rapidly as possible and not later than Jan. 1, 1919, for in no other way can you be sure of the continuance of your industry and the preservation of your organizations."

"We regret that we are not in a position at this time to give you a more definite reply to your communication of the 8th instant due to the fact that the data and information which on July 16 we requested you to promptly furnish us has not yet been received. As soon as received prompt and appropriate action will be taken of which you will be immediately advised.

"No material will be furnished to any passenger automobile manufacturer until it has filed with this board a sworn statement embodying the information requested on July 16 coupled with an agreement to furnish this board with such additional information from time to time as it may require.

"Yours very truly,
"WAR INDUSTRIES BOARD."

No Limitation On Sale of Gasoline

Fuel Administration and War Industries Board Deny That Any Restrictions Have Been Approved.

The quite general adoption of the plan recommended by the National Automobile Dealers' Association for the closing of service stations and gasoline distributing stations on Sundays and after 6 o'clock at night, which plan was approved by the conservation committee of the War Industries Board, has invoked a statement from the Fuel Administration and War Industries Board, which was issued to dispel the belief that any such campaign had been authorized from government sources.

This statement, which appeared under date of Aug. 2 in the government publication, the "Official Bulletin," is as follows:

"The attention of the War Industries Board of the United States Administration has been called to the wide prevalence throughout the United States of a mistaken impression that some order or recommendation has been issued from Washington with respect to the sale of oil and gasoline. In some places local automobile dealers' associations have even issued circulars laying down the rule that dealers in oil and gasoline must make no sale of these products on Sundays and holidays or after 6 p. m. on other days, and stating it is an order from Washington.

"No such order or recommendation has been issued by any governmental authority or with any governmental approval. The fuel administration has urged that wasteful practises in the use of oil and gasoline be stopped and that all reasonable and proper measures of conservation be observed. No limitations, however, have been placed upon the sale of these products.

"It is not intended to interfere in any way with the activities of automobile dealers' associations or others who, after consideration of the local conditions, may seek to bring about some limitation upon the hours during which oil and gasoline shall be sold to the public; but it is desired that it be clearly understood that no orders or recommendations have been issued by any government authority upon the subject."

GEAR MANUFACTURERS WILL HOLD MEETING NEXT MONTH.

The semi-annual meeting of the American Gear Manufacturers' Association will be held at the Onondaga Hotel, Syracuse, N. Y., Sept. 19, 20 and 21. Announcement of the program will be given later.

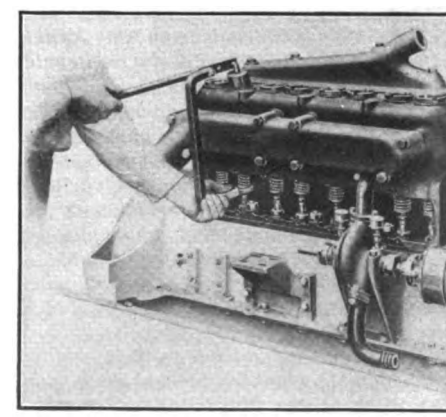
BUDA VALVE LIFTER.

If an engine is to deliver its full capacity on a minimum of fuel, careful attention must be given to the matter of keeping the valves in proper shape.

The removal of valves for inspection or grinding is a difficult task with the tools usually furnished as part of the equipment of trucks and tractors. Added to this there is the liability of doing serious injury to the valve stems or push rods.

To simplify the removing of valves the Buda company have placed on the market a valve lifter, which is shown in use in the accompanying illustration. This tool can be used on all models of Buda engines except the RU. By substituting a smaller block to fit the port hole openings the tool can also be used on that model.

Prices and descriptive circular will be sent on application to the Buda Co., Harvey, Ill.



Buda Valve Lifting Tool Designed for All Models of the Buda Engine Except the "RU."

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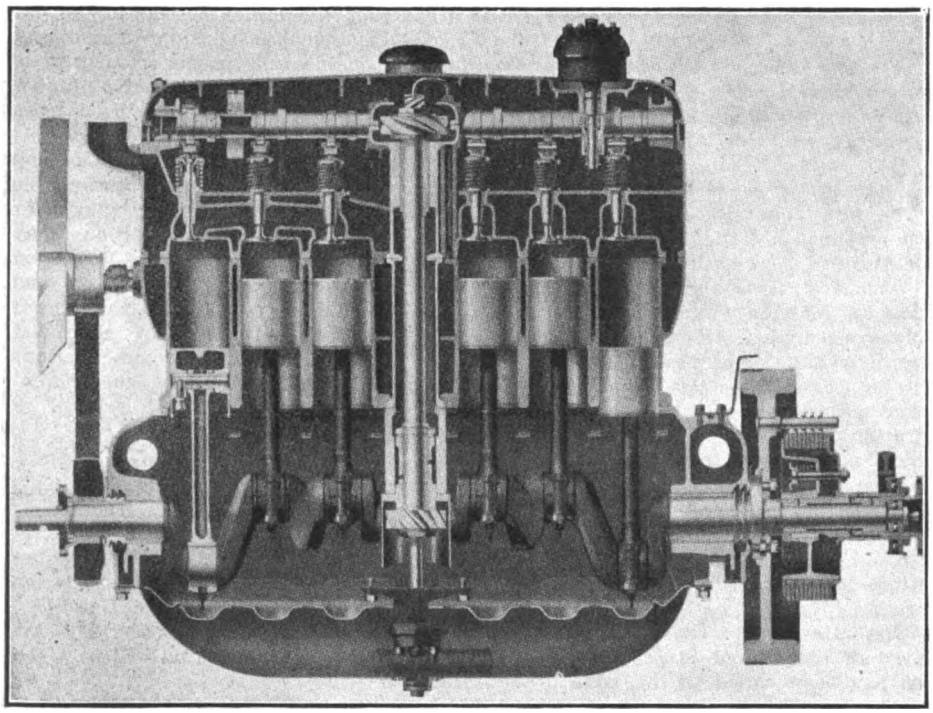
Overhauling The Automobile

The Chalmers 6-40 Engine

This is the 26th article in a series dealing with the overhaul of used cars which are being published in response to many requests from subscribers. With the present outlook indicating even greater activity in the overhaul, repair and renovation of used cars these articles will be continued for the purpose of demonstrating that the automobile has extensive service value, which can be greatly increased by a slight outlay for replacement of parts and adjustments.

By C. W. AGNEW.

This engine is one of the most complicated built and is a very powerful engine when working properly. It is so much different from the ordinary type of engines that it is a hard task to find repair men that are capable of understanding it.



The Chalmers 6-40 Engine Showing Valve Mechanism and Assembly.

The first thing to do is to forget that this engine is different from any other and that it is just an ordinary four-cycle engine, having a crankshaft, camshaft, cam gear, valves and rocker arms. The difference being in that the camshaft is at the top of the engine and of course the crankshaft at the bottom. A vertical shaft running from the crankshaft up through the cylinder block and cylinder head meshes at the lower end with a bronze gear on the crank gear and with an upper gear of steel that meshes with the cam gear.

With the oiling system in this engine the greatest trouble arises from too much oil reaching the cylinders, thereby causing smoke and fouled spark plugs. At the left side of the engine at the bottom of the vertical shaft is the oil pump. Oil travels from the pump directly to the outside of the crank case through a pipe clear around the front of the engine to a point directly opposite the pump. The outside oil line gives the oil a chance to cool before going to the bearings. At this point it leads to a cross connection and from there goes in three directions, up, down and straight back towards the rear of the engine. Taking the feeds in the order named, the oil travels up through a short oil line to an elbow in the head of the engine and through the head up the rear center cam bearing. From there it runs to the inside of the hollow camshaft through a small hole and so floods the whole length of it, oil escaping through small holes drilled in the shaft to lubricate all the bearings and rocker arm rollers and also the bronze timing gears.

Main Oil Feeds.

It is now seen that oil is supplied to everything in the engine head except the upper vertical shaft gear and the cam gear. Oil comes to these directly from the rear center cam bearing. Of course there is a large amount of oil that will not go into the hole in the camshaft and this travels through a channel cut in the bearing to an overflow oil line at the top of the bearing cap. This line should be so bent that oil will pour directly on the spot where the two gears mesh. Oil returns to the crank case through a large opening directly under the cam gear, down and over to the vertical shaft and follows this shaft down to the crank case, thus lubricating the lower vertical shaft bushing and gear as it returns to the starting point. When these engines were originally built there was a wire screen placed in the large oil return hole in the head to strain the oil, but these screens should be removed as they are very liable to clog and prevent the oil from returning to the crank case and endangering all the main and connecting rod bearings.

The pipe that leads down from the cross connection carries oil to the four main bearings and the overflow pipe from the front and rear bearings should be bent so that oil will overflow into the inner or splash pan, as this is the only means the connecting rods have of getting oil.

The third and last branch of the cross leads to a pressure gauge. If there is no oil pressure, look for loose connections, cracked or punctured oil lines, loose main bearings or a damaged pump.

This is the original method of oiling, but has in a good many instances been found to cause too much smoke, so I will try and describe how the system may be improved and this defect remedied.

Drill a ¾-inch hole in the Welch plugs in the ends of the camshaft, so as to allow oil to come out of the ends instead of it having to pour from the cams down over the valves. Drill two ¼-inch holes in extreme ends of cam front and rear bearings to allow the oil from the ends of camshaft to return to the bottom of cylinder head. These holes must be drilled one on each side of each bearing about half way up from the bottom so as to cause oil to flood across the ends of the shaft, keeping it running in oil. Before starting to drill these holes run your finger underneath the bearings in the place where you intend to drill, and you will feel a reinforcing wall. Make your center punch mark so that the drill will break through just in position to clear it. Also when drilling the front bearing be very careful to stop as soon as you break through or you may drill through clear

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into the water jacket. Drill ⅛-inch hole underneath the cam toe to allow oil to come from center of camshaft to lubricate the toe. This hole must be drilled so as to just miss the key in the collar or it will be impossible to drill to the center of camshaft.

Piston Lubrication.

Enlarge the oil holes in the pistons to ⅛ of an inch. See that piston and rings fit properly, also that cylinders are not tapered or out of round. After following these instructions if the engine still smokes, send it to a Chalmers service station for four metal plates called "baffle plates." These plates are shaped so as to fasten under cylinders No. 1-3-4-6, and prevent some of the oil from throwing up into the cylinders. This covers what I consider the most important part of the engine, and while one may think that I have given a lot of unimportant facts, there is no other way to stop this trouble.

Overhauling the Engine.

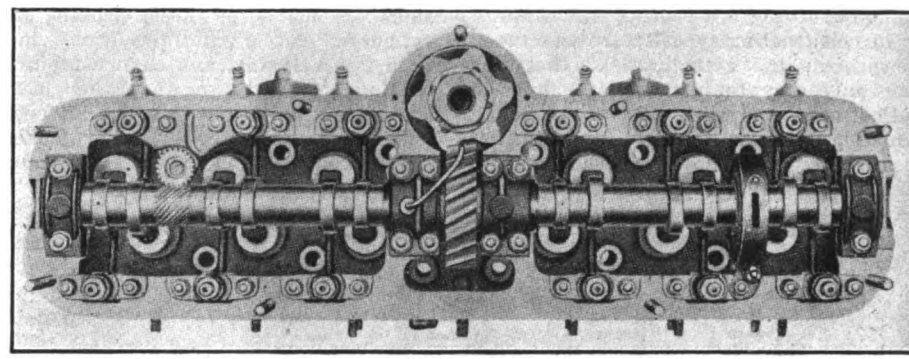
It is not necessary to take the engine from the chassis unless one wants an absolute overhaul done. I will state how to rebuild the engine after it is taken from the chassis so that one may use whatever part of these instructions needed.

In removing the radiator, remove the four cap screws that fasten the upper water elbow to the engine, and allow these connections to stay upon the radiator. Tag all the wires, rods, etc., so as to know how to put them on again. Remove the inlet manifold, together with the carburetor. Free the engine from the mud pan, engine bolts, clutch throw out yoke and universal joint. Drain off all the oil. Take off the cover of the engine. Remove the nut which holds the cam brake to the head. Take out the camshaft, being careful not to lose or change any shims while doing so and put the bearing caps and nuts back in their places as soon as the shaft is removed. With a center punch mark the rocker arm brackets so as to know how to put them back over the same valve from which they were removed. It is not necessary to remove the rocker arms from their brackets, just take a 31-inch wrench and run the nuts up to the top of the stud, bit them a good blow to drive them down so that the nut touches the bracket. Now remove all the bracket nuts and they can be lifted out. Take off the upper vertical gear and then the sleeve which gear sets over. Remove all the 7/16 nuts in the head and also one at each corner, which can be taken off from the outside. Disconnect the short oil line under the exhaust manifold and turn the elbow to the left as far as possible so as to prevent dirt getting in while you are working on the head. Two men can now lift off the head and then the rest of the engine can easily be taken from the chassis. Have a stand ready so that the engine can be turned bottom up while the work is being done.

Remove the oil and splash pans and the oil line that leads to the four main bearings. Loosen the packing nut on the outside oil line where it goes through the crank case and disconnect the oil line from pump. Remove the two ⅜ cap screws and the pump and screen can be lifted out. Pull the pistons and rods after first making sure that the numbers on the rods and caps are on the same sides and looking into pistons to see that the wristpin set screws are all towards the front of the engine.

Remove the lower vertical gear with a puller. If the vertical shaft is too loose on the lower bushing, remove the three screws in the bottom and the bushing can then be removed from the case by tapping on upper end of the vertical shaft with a soft hammer. It is then an easy matter to put in a new one, which must be reamed out 1¼ inches. Make sure there is a nice free fit before putting bushing back into place. Also while the shaft is out try and fit in the upper bushing the same way. Next remove the clutch and flywheel, being careful not to lose the three spacing rings between flywheel and shaft, as these rings take the weight off the flywheel from the studs and also hold it on center.

Remove the generator chain guard and fan pulley. Then remove or loosen the generator so that the chain can be taken off. Remove all main bearing caps and lift out the crankshaft, laying it in a safe place where it cannot fall and be injured. Remove the old packing from the front and rear bearing caps as new packing must be put in when the engine is reassembled. Wash the whole engine in kerosene and wash all parts perfectly clean.



The Motor with Cylinder Head Removed Showing Staggered Valve Installation.

Reboring Cylinders.

If it is found necessary to rebore one cylinder, rebore all of them and fit all new pistons and rings, but do not have the bore exceed 3.145 of an inch or you will be unable to get pistons to fit, which will necessitate purchasing a new cylinder block. This amount allows .020 of an inch for grinding, as the standard block measures 3.125 of an inch.

To build up the engine again and have it perfect as possible the following rules are suggested:

Crankshaft not to be sprung or out of round over .002 inch.

Crank and cam gears should indicate not over .0003 inch.

Camshaft not to be sprung over .002 inch.

Camshaft not to be sprung out of round over .001 inch.

Flywheel should indicate either way not over .006 inch.

Vertical shaft reamer 1¼ inch.

Wristpin reamer 13/16 inch.

End play in crankshaft not over .006 inch.

Piston side play, .004 inch to .006 inch.

Rings should fit snugly, pushing them all the way through with a piston.

Set screws in pistons should be toward the front of engine.

Hole in sleeve for upper vertical gear set screws 17/64.

Wristpin should fit bushings just loose enough so that rod will fall over of its own weight.

Main bearings should be just free enough to allow the shaft to be jerked around with the hands, when but one bearing is tight and connecting rods are not in. Taking it for granted that the bearings are all good we will now build up the engine.

Lay the crankshaft in the case, adjust the main bearings and put on the fan belt and then the generator chain. The flywheel comes next, which will only go on one way. When the flywheel is attached and the main bearings all tight, take the crank and the shaft should easily be spun around. Make sure that there are corks in both front and rear bearings and fit them so that they do not quite touch the shaft or oil will leak out. Pack the bearings with candle wicking and shellac. Put back the pistons, spacing the rings three ways and adjust the connecting rods so that they will push over with the hand and go back with a snap. Look into the pistons and see that the rod does not touch the boss, as this will denote that the piston is out of line and that the rod must be straightened. Attach the lower vertical gear, making sure that the key enters the keyway in the gear.

Drive the gear on with a piece of wood so as not to injure it. Set on a plain washer and then screw the nut down as tightly as possible so to take out all the end play from the shaft. It is now impossible to turn the crankshaft around with the hand crank. Loosen the nut about three-quarters of a turn and use the wooden block against the bottom of the vertical shaft, giving it two good blows and then try the crankshaft to see that it turns freely. Then put on the lock washer and tighten down the second nut and if the crankshaft still turns freely, lock the nuts by bending two lugs

(Continued on Page 38.)

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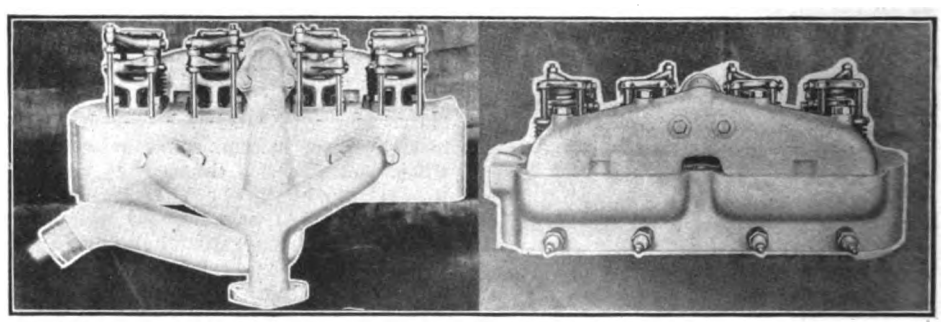
Laurel Motors Corporation Brings Out New Roof Sixteen Valve Cylinder Head

Robert M. Roof, mechanical engineer for the Laurel Motors Corporation, has designed a new 16 valve cylinder head for Ford motors especially adapted for touring car and it will be known as type B. Type A, which is the original 16 valve cylinder head designed for Ford by Mr. Roof, first came into prominent notice through the wonderful power and speed given to Ford racing cars by the use of the 16 valve head, and wonderful track records were made by Ford cars with the type A equipment. It is also used with great success on trucks and is now used to a large extent on touring cars, but it is more particularly adapted for speed work. The demand by Ford touring car owners for 16 valve head carrying features not embodied in type A caused Mr. Roof to design the new model type B, illustrations of which are shown herewith. Radical changes have been made in type B as compared with type A, and many of them will appeal quickly to the Ford touring car owner.

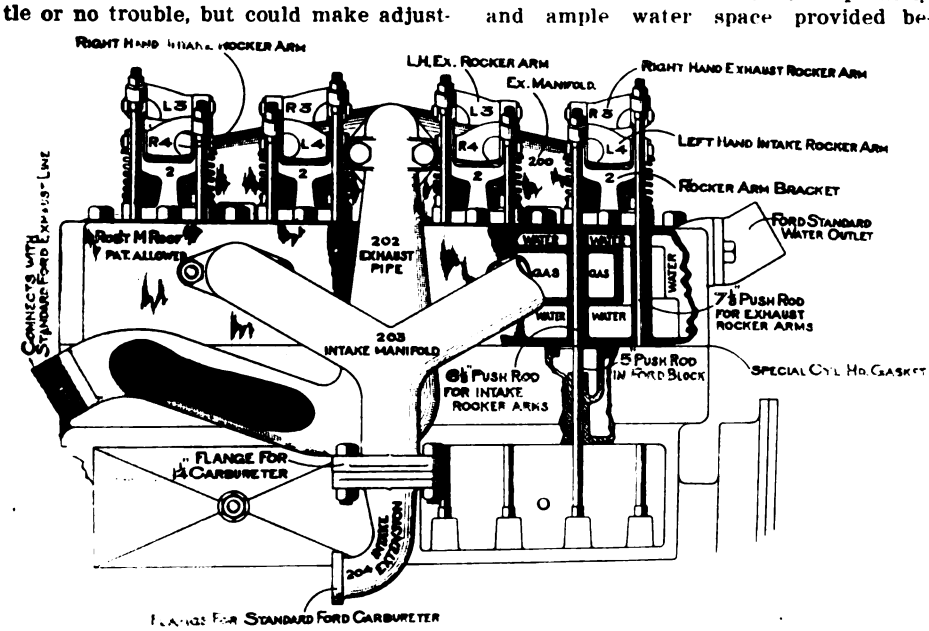
In constructing type B care was taken to provide the cylinder head that was not only easy to install, but simple in adjustment, and with easy access to all moving parts so that the Ford owner could not only install the head with little or no trouble, but could make adjustments whenever necessary without calling on expert assistance. The arrangement for passage of gas in cylinder block is nearly perfect and condensation almost impossible. Gas is distributed to cylinders by Y shaped manifold with sub divided channels in cylinder head instead of through the regular intake and exhaust openings in the cylinder block as is the case in type A. Regardless of the firing order of the cylinder the mixture in type B is distributed equally to each cylinder and most exhaustive tests show it is almost impossible to load the motor at any speed.

In type A the spark plugs are located directly on top of combustion chamber, while in type B the spark plugs are located on exhaust side, but with explosion direct into combustion chamber. Provisions are made for direct priming into cylinders and great precautions have been taken against any chance for overheating. Not only are the water jacket spaces extra large size, but all spark plugs are surrounded by water jackets. Each exhaust is carried off separately and ample water space provided between, which eliminates any possibilities of valve warping. Air leaks of any character into the mixing chamber through push rod guides are entirely eliminated, as the push rods operate through bosses not connected with mixing chamber, as was the case with type A.

Where speed is desired loose push rods are of little consequence, in fact the additional air through loose push rods is of advantage in speed work. As there is but little or no chance for air leaks in type B, throttling down the motor to very low motor speeds is insured. There are no abrupt curves to cause back pressure either in intake or exhaust. Great attention has been given to securing evenness in the thickness of cylinder head walls, which will prevent irregular contraction and expansion and thereby increase the thermal efficiency of the head. Water outlet on cylinder head and connection with exhaust pipe are regular Ford standard. Cylinder head water jacket is so designed as to eliminate all chances for steam or air pockets, the outlet being at the highest point. The exhaust manifold is designed not only to connect with Ford exhaust pipe on same side as intake, but also to heat the intake manifold at the proper point and every advantage claimed for hot spot manifold are enjoyed by the Ford motor owner with the new designed type B head. Provision is made on intake manifold for either the regular Ford one-inch carburetor or any standard 1¼-inch carburetor, and installation can be made without interference with nearly all electric lighting and starting systems for Fords.



Right and Left Side of Type B Sixteen Valve Cylinder Head for Ford Engines.



Detailed Drawing of Roof Head Showing Its Application to Ford Block.

Type A will be continued for speed purposes and will be known as the racing 16 valve head and will also be sold for use with truck units, while type B will be sold for touring car service and to some extent for use in connection with truck units. Nearly all tests with type B were made with a Ford sedan and the pulling power and hill climbing ability were shown to be fully equal to the type A and the sedan could be throttled down to a few miles per hour on high gear and a speed of more than 50 miles per hour was quickly reached and maintained.

The company already have a great many orders on their books for the new head from agents, several of the contracts being of very large size. The Guaranty Motors Co., Cambridge, Mass., manufacturers of truck units and hoists for Fords, are adopting the Roof 16 valve head as standard equipment to go with their two-ton truck units.

The price of type B cylinder head will be $100 complete, including manifolds, plugs and wires.

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Thermostatic Control of Generator Charging Is Developed by Remy.

By GEORGE V. McMAHON,
Assistant General Manager Remy Electric Co.

It is a matter of common knowledge among motorists that more current is required for lights and for the starting motor in the winter than in the summer, and as a result the battery is often in a drained condition. The condition of the roads and streets in winter is such that cars are driven more slowly, and again the battery suffers if special provision is not made to keep the battery charged.

The problem of supplying a high charge rate to meet the demands of winter driving would be simple if the battery were capable of standing up under a continuous high rate of charging.

When a battery is being charged its temperature tends to rise above that of the surrounding atmosphere. The higher the charge rate and the more nearly charged the battery the greater the increase of temperature produced. The effect of this increase of temperature is to evaporate the water from the battery, and if carried too high to cause shedding of the active material of the plates, thereby reducing the capacity and greatly shortening the life of the battery.

With a reduction in the demands for current for lights and starting in the summer the battery is in a more nearly charged condition, and as the atmospheric temperature is higher, the charge rate must be lower if the battery is to be kept from overheating.

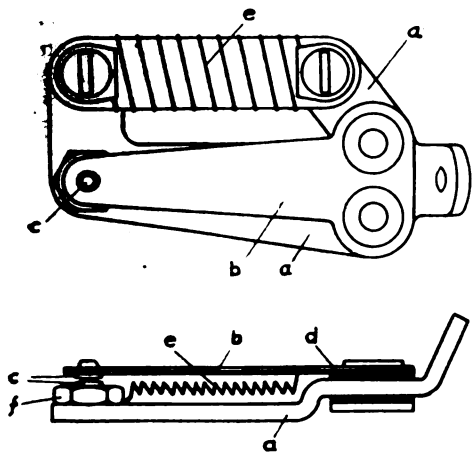
To meet this variation in demand for current the Remy generator has been designed for large current capacity and provided with a thermostat control, which automatically reduces the generator output to a safe value for summer conditions.

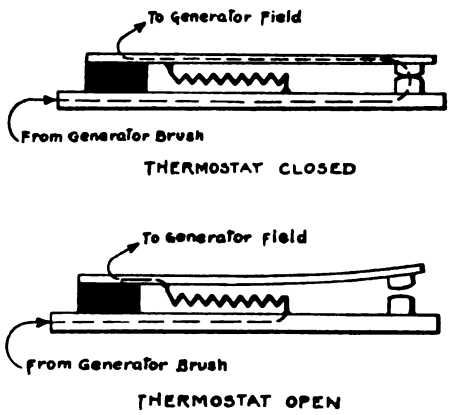
The designers of the Remy thermostat control have taken advantage of the fact that generators, as well as batteries, produce heat in a definite relation to the rate of current flowing, and that the temperature attained in the generator is furthermore dependent on the prevailing atmospheric temperature.

A simple and positive acting thermostat has been mounted on the brush rigging in a position where the effects of atmospheric temperature and the heat produced in the generator windings are averaged.

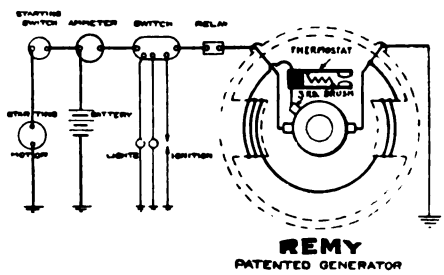
Mechanically, the thermostat is constructed as illustrated.

A stamped steel bracket carries a resistance unit, a silver contact point and a thermal blade, insulated from the bracket and carrying a second silver contact point.



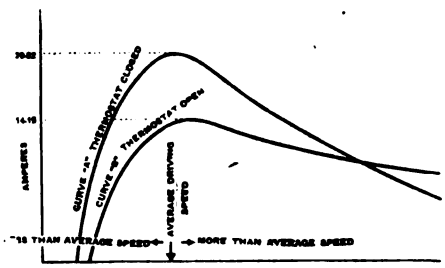


The contact point in the thermal blade is held against the similar contact in the bracket, by the spring tension of the blade itself at low temperatures. The blade is, however, made of a strip of spring brass welded to a strip of nickel steel—a combination which warps when heated, due to the greater expansion of the brass. Thus the contacts are separated by the bending of the blade whenever the thermostat is heated to approximately 175 degrees Fahrenheit.



It will be seen from the illustration above that when the thermostat is closed the field current takes the low resistance path through the contact points, but when the thermostat is open the field current is forced to go through the resistance unit. By this automatic insertion of resistance in the field current the generator output is reduced to a predetermined value.

To illustrate the operation of the thermostat by refering to the curve in accompanying cut it will be seen that at normal speed the generator output will be 21 or 22 amperes after starting with a cold machine. With atmospheric temperatures around 70 degrees Fahrenheit the thermostat will open after two or three miles, which is sufficient time to make up for the amount of energy taken from the battery in starting. When the thermostat opens the output will drop to 14 to 15 amperes at average driving speeds. In very hot weather the thermostat will open much quicker. In extremely cold weather the thermostat will remain closed, insuring the continuous high generator output needed to meet the increased demands made by the starting motor, and the increased burning of the lights.



In addition to correcting the discrepancy between winter and summer demands for current, the thermostat control makes it possible to keep the battery fully charged under unfavorable conditions, such as an exceedingly large number of starts, and use of the car mostly for night driving.

This thermostat control is supplementary to the well known third brush regulation, which keeps the charge rate from rising above the predetermined maximum of 20-22 amperes for a cold generator when the car is operated above average driving speed.

PROPER SPRING LUBRICATION.

One of the most annoying things about an automobile is a squeaky spring. When a motorist complains about it to his garage man or to the dealer who sold him the car, it is evident that he has not been using the right kind of lubricant. Plain oils and greases squeeze out and permit friction between the bare metal of the leaves. The proper lubricant is one that will form a tough, enduring film between the leaves, preventing metal-to-metal contact.

The Joseph Dixon Crucible Co., manufacturers of Dixon's Motor Graphite, give this advice about lubricating the springs: Jack up the car so that all the weight is off the springs and spread the leaves apart with a screw driver or instrument provided for that purpose. Then smear a creamy mixture of kerosene and motor graphite between the leaves.

Springs thus treated will ride much easier and will be entirely free from squeaks. If the graphite is of pure flake variety it will adhere to the surfaces, filling up and smoothing over the minute irregularities and will not squeeze out.

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Cut in Tire Production Requested

Manufacturers Asked to Reduce Output of Casings and Tubes During August and September to 50 Per Cent. of Amount Produced in Same Period in 1917

Curtailment of the amount of crude rubber available for manufacture into pneumatic automobile tires is indicated from the results of the meeting of all branches of the rubber industry held recently in New York, when representatives of the War Industries Board explained the situation as it affected their business and requested the manufacturers to cut their output of pneumatic tires for pleasure automobiles during August and September 50 per cent.

The meeting was held under the auspices of the Rubber Association of America, with B. G. Work, president of the B. F. Goodrich Rubber Co., presiding.

The allocations of rubber that have been in force, so far as importations and manufacturing are concerned, during May, June and July, are to continue for another 60 days, during which period it is expected that the manufacturers of rubber goods will succeed in placing such restrictions on their output as to comply with government requirements. Transportation of rubber have been restricted by the War Trade Board to 100,000 tons of crude rubber per year and during 1917, 160,000 tons were consumed, and the rate of consumption has grown so that more than twice that quantity could be used this year if supplies were available. Manufacture of pneumatic tires use about 70 per cent. of all rubber imported.

Government requirements have been responsible for the increase in the demand for tires and rubber. The number of orders for truck tires have been more than quadrupled. Under the plan for controlling the industry during August and September all goods ordered by the United States and the Allied governments will be manufactured in full and the remaining supply of crude rubber will be manufactured at the rate of three-eighths of consumption for the corresponding two months' period of 1917. The situation was summed up in a letter written by George N. Peek, commissioner of finished products for the War Industries Board, to Bertram G. Work, chairman of the war service committee for the rubber industry.

Following the meeting there was considerable discussion in the industry as to the effect of the new situation upon the smaller manufacturers, as in many cases with this class of producers the curtailment plan would mean a severe hardship if not entire cessation of production.

The following is the letter of the War Industries Board in part:

"Your industry has operated during the months of May, June and July on the plan of allocation of crude rubber under a limited tonnage arrangement with the War Trade Board and as additional information is necessary before finally determining upon the allocation for August, September and October (which information you are now compiling) it has been determined that for the months of August and September substantially the same arrangement and percentage of allocation will continue.

"Your industry should understand that the need of conserving shipping space is as great, or perhaps greater than when this matter was first taken up last April. We understand that while approximately 25,000 tons were licensed for import during the months of May, June and July (although considerably more than this has been received), approximately 50,000 tons will have been consumed by the industry. It is obvious that something radical must be done at once to curtail the consumption of rubber and we feel sure we may rely upon the support of the industry in taking such immediate steps as may be necessary to conserve the present stocks of rubber now in the country and those due to arrive.

"The government departments are making every effort to determine requirements of crude rubber for essential war and business purposes, and as soon as this information is at hand steps will be taken to insure the import of sufficient rubber to meet those requirements.

"As a means of conserving the stocks of crude rubber now in the country, your committee has suggested curtailment of the production of pneumatic automobile tires and tubes during the months of August and September, and we request you

"(a) To pledge the manufacturers of pneumatic tires and tubes to restrict the production in tonnage of rubber consumed and in numbers of casings and tubes to the extent of 50 per cent. of the production for the corresponding months of August and September of last year. But in no event shall the manufacture of pneumatic casings and of tubes during the month of August, 1918, or the month of September, 1918, exceed 50 per cent. of the monthly average for the year 1917 both as to amount of rubber used and number of pieces produced.

"This restriction is exclusive of government business.

"(b) That you carefully consider restricting the manufacture of all other articles involving the use of rubber, as every possible saving should be made.

"You are thoroughly familiar with the industry to which we look to patriotically and conscientiously cut out the consumption of crude rubber at every point where it can be done without injury to the nation's welfare.

"A curtailment such as mentioned above, in the production of pneumatic tires and tubes and other articles, will not accomplish the desired results unless some plan is evolved for limiting and regulating the use of motor vehicles and we expect the use of rubber tires will be restricted except for actual war and essential business purposes. We are not at liberty at this time to announce our plans for accomplishing this purpose, but will do so in the near future.

"Every necessary step should be taken to discourage and prevent hoarding of the finished product by manufacturers, wholesalers, dealers and consumers, and we ask you—

"(a) To evolve some plan, and put it into effect, which will accomplish this end, and to see to it that if any one of these factors are guilty of hoarding, that steps be taken to prevent their securing additional supplies:

"(b) That advances in prices be prevented.

"We look to you to see that this is accomplished.

"Before arrangements are concluded for the importation of rubber after the month of September, with your co-operation we expect to evolve definite plans which will accomplish the purposes we are after; i. e., the conservation of every foot of shipping space possible by the conservation and restriction of the use of rubber.

"We ask that you facilitate your final arrangements for co-operation with the conservation division in making such changes in the manufacture and distribution of your product as will result in the conservation of rubber during the period of the war.

"We anticipate your complete co-operation in all of the above matters and assure you of our desire to see that the industry is provided with the necessary raw materials to take care of the war and essential civilian needs as soon as that can be determined, and give you our further assurance that we desire to curtail the industry only insofar as it may become necessary to meet the war needs."

PURITAN MACHINE ADDS BROC-ELECTRIC TO ORPHAN LIST.

The latest addition to the long list of orphan cars, of which the Puritan Machine Co., 10th and Lafayette Aves., Detroit, Mich., supplies parts, is the Broc-Electric, formerly of Saginaw, Mich. The entire stock has been removed to Detroit.

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MANY ADDITIONAL MILES ON RETREADED TIRES.

"If motorists were better acquainted with the advantages of having their tires retreaded when not worn through the carcass, many miles would be added to tire life," stated Mr. Dwyer of the Wakefield Tire Co., Wakefield, Mass.

"A retread can greatly extend the usefulness of a tire carcass that has had good care, but a tire that has been run 'soft,' overloaded or tread cut, or mistreated in other ways, cannot profitably be so repaired.

"But where the tire has had good care and the fabric is uninjured, a retread is a profitable investment. Many thousands of miles are added to tire life in this manner. A new tread can be built into a tire that will greatly increase its length of service.

Vulcanizing treads on used tires has reached so great a degree of perfection that even racing drivers are using retreaded tires. In the past racing drivers have never used tires that have undergone any kind of repairs—only new tires were considered safe. But that retreaded tires are a success on the race track is abundantly proven in the experience of Louis Chevrolet, who during the past winter season won several races on the western coast on retreaded tires.

"In the interest of conservation every motorist should first consider the advantages of a retread before sending to the scrap heap his old tires. The charge is about one-third the cost of new tires with a guarantee of 3000 additional miles."

QUESTION OF AUTOMOBILE TAX STILL UNDER DISCUSSION.

What final form of taxing the motor car owner will be decided upon by Congress it is not possible as yet to predict. All revenue measures originate in the House of Representatives and then go to the Senate, which may disagree radically with the House's interpretation of the situation. Then the measures passed by the two branches go to the conferees.

President David Jameson of the American Automobile Association recently presented to the two committees the case of the car owner in communications to Chairman Kitchin of the House Ways and Means Committee and to Chairman Simmons of the Senate Finance Committee Mr. Jameson commented upon the fact that the motorist now receives extensive taxation attention from the several states, referred to the certainty that any impost on new cars would be passed along to the consumer, and contended that any charge on the original cost of used cars would be manifestly unjust. Mr. Jameson asserted that it would be as fair to tax coal as gasoline, since both are fuel producing quantities.

Several days after the filing of Mr. Jameson's communication the House committee announced that it had decided to base the Federal tax on cars in use on a horsepower basis instead of on the original cost.

Harry Dunn Heads Rubber Section of War Board

Head of Fiske Rubber Company Will Supervise Country's Rubber Industry.

Harry T. Dunn, president of the Fiske Rubber Co., Chicopee Falls, Mass., has been appointed head of the newly created rubber section of the War Industries Board. This position will require most of his time and while he will not give up his duties with the Fiske Rubber Co., he will make his headquarters at Washington.

E. H. Broadwell, vice president of the Fiske Rubber Co., has succeeded Mr. Dunn as a member of the War Service Committee of the Rubber Association of America.

HUBBARD ASSORTED SPRINGS FOR GARAGE AND REPAIR MEN.

Every garage and repair man finds a constant demand and need of small springs, cotters, washers and other similar parts. Because these parts are seemingly unimportant he neglects to provide an ample stock with the result that much time and labor is wasted and often a makeshift repair or adjustment is turned out, which later costs him prestige as well as money.

After studying the needs of this branch of the automobile trade the M. D. Hubbard Spring Co., Pontiac, Mich., have made up an assortment containing a large variety of springs that can be used for purposes of this kind, either as they are made or by slight alteration. This assortment contains 16 pounds of springs and sells for $2, which is a lower price per pound than the average assortment, as it contains a much larger quantity. It is sent on approval or subject to inspection to responsible buyers or to anyone on deposit subject to return. When sent on approval the buyer is asked only to pay transportation charges one way in consideration of the privilege of inspection and acceptance or rejection.

GASOLINE PRODUCTION IS GREATER THAN LAST YEAR.

The average daily production of gasoline during May of this year was 10,302,942 gallons, an increase of 523,070 gallons per day over April. The figures just issued by the Bureau of Mines also shows that the stock of gasoline on hand on the last day of May was 460,637,479 gallons, which is less than was on hand on April 30, when the stock was 509,197,134.

The production of crude oil in May totaled 28,510,698 barrels, giving a daily average of 919,700 barrels. The stock of crude on hand on May 31 was 11,824,633 barrels, as against 12,600,062 barrels for April 30.

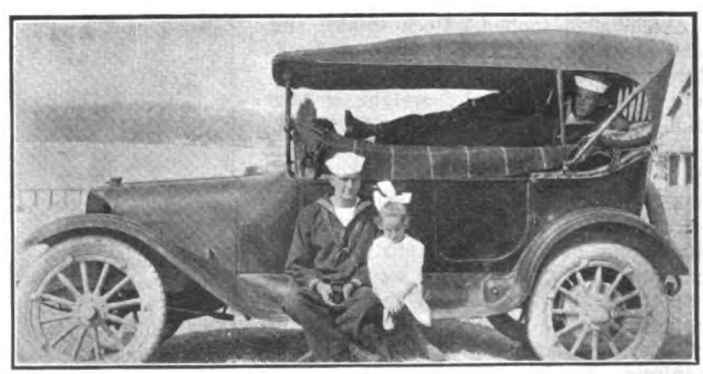
ROEDDING SIGNAL TO BE PATENTED THROUGHOUT WORLD.

K. G. Barkoot, distributor of Roedding Signal Tail Light, has made application for patents on the Roedding signal light in all of the main countries of the world and has received advices of the allowance of patents in several of these with notification of the receipt of the claims in all others Patents will be issued in one form and another in England, Australia, France, Belgium, Italy, Russia, Japan, Spain, Brazil, Argentine Republic, Chili and in South Africa. Three applications, one for trade mark, one for design and one for mechanical patent with three other protective patents have already been made and others will follow, as it is the intention of Mr. Barkoot to protect in every way and in every country the patents of Roedding.

JORDAN MOTOR CAR CO. PAYS 8.6 PER CENT. DIVIDEND.

The Jordan Motor Car Co. on Aug. 1 paid a dividend of 8.6 per cent. to the holders of the original Jordan preferred. Jordan production, which was originally limited to 2000 cars annually, has proceeded at that rate since the first cars were shipped, yet on Aug. 1 the company was several hundred orders behind in deliveries. The company has been turning over its capital practically every 30 days, and in the July period the earnings were at the annual rate of 160 per cent. on the capital invested.

The McMillan Bed is designed to provide a comfortable spring bed while touring and is placed over the back of the car seats, providing room for two persons. It weighs 13 pounds and rolls into a bundle two feet long and four inches in diameter. It is made in a number of models to fit the various makes of cars.



Manufactured by the Auto Bed Co., Bellingham, Mass. Price, $10 to fit Fords, Chevrolets "490" and Baby Overlands. $12.50 for models to fit the Dodge, Buick, Overland, Studebaker. $15 for seven-passenger cars.

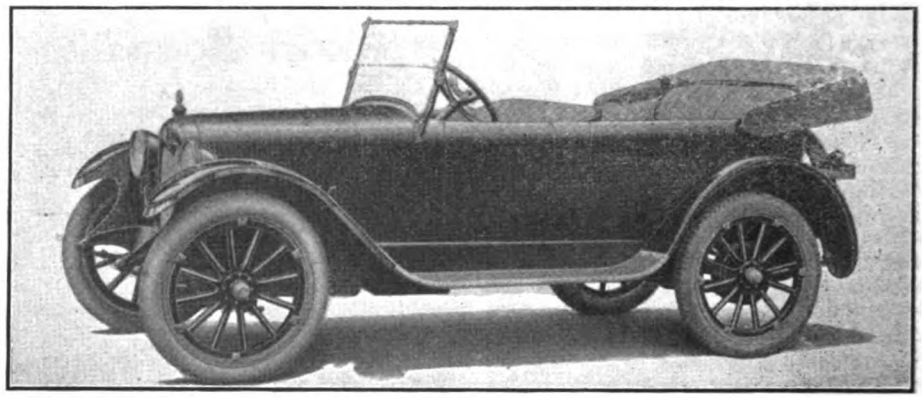
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Pan Has Compact Engine and Sleeping Car Body

THE first announcement of a 1919 model passenger car comes from the Pan Motor Co. of St. Cloud, Minn., manufacturers of the Pan, and it is of unusual interest, as while the majority of makers are continuing their old models, this company is to introduce many new features.

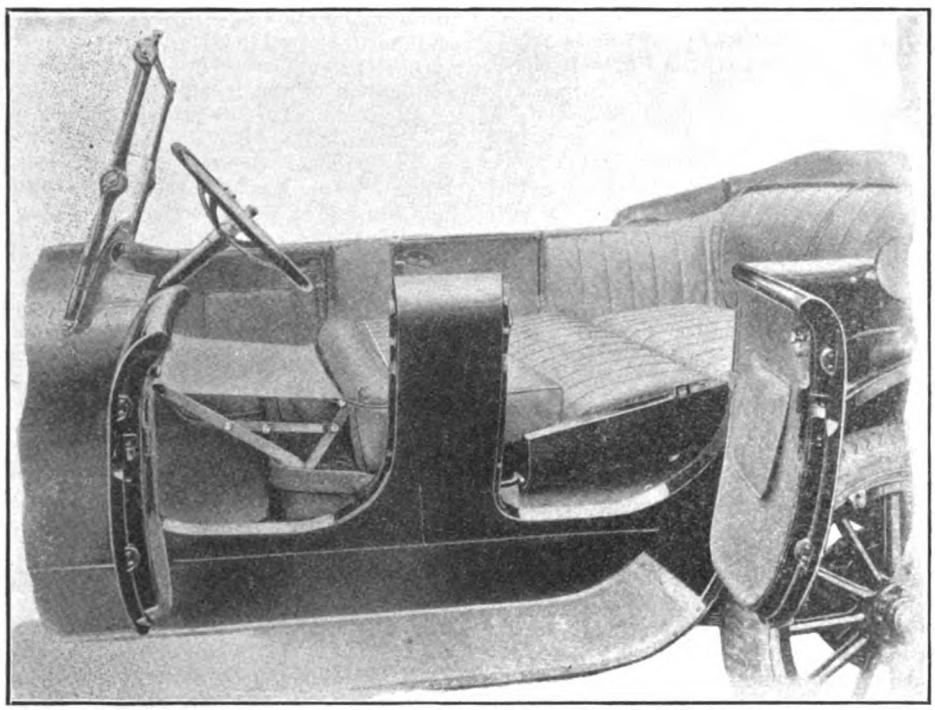
Production will be confined to one chassis, the same as was shown at the various shows last winter, and this will be equipped with touring, roadster and sedan bodies.

It will not be an assembled car like the 1918 model, but will be built complete in the company's own plant. It was designed by Victor Gauvreau, chief designing engineer of the company, and although there is nothing radical in its design, many new ideas are incorporated.



Pan Tourist Sleeper Model Has Many Novel Engine and Body Features and Seating Arrangements of Conventional Type.

The most interesting feature of the car is its compact motor, which is of a light weight, high speed, four-cylinder type, with a bore of 3¼ inches and stroke of five inches. Both intake and exhaust valves are 1¾ inches in diameter in the clear. The overall length is only 27 inches and the weight is less than 400 pounds.



Detail of the Pandolfo Sleeping Car and Method of Transforming the Body Into a Bed Compartment.

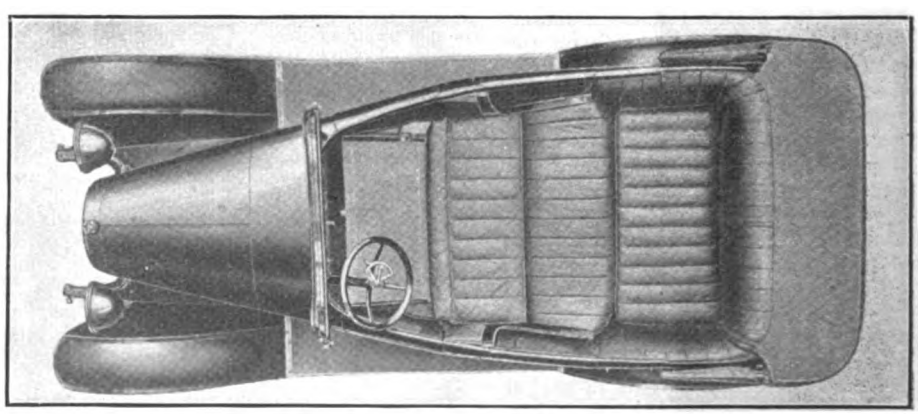
The intake valves are in the head and the exhaust valves are on the side. The cylinder head is removable, which leaves both sets of valves accessible. The carburetor is bolted directly to the head and the intake manifold is cast integral with the head. The flow of gas from the carburetor is evenly distributed to all cylinders through the design of intake manifold. Hot air is supplied to the carburetor from a passage cast integral with cylinders.

The crankshaft is fully counterbalanced by a patented device and is hung on two ball bearings. The crank pins are unusually large for this size of motor, being 2⅛ inches in diameter. Due to the use of ball bearings and the special counterweight, a very compact and rigid barrel type crank case is employed, being cast en block with the cylinders. Intake and exhaust valves are both opened by the same camshaft; the cams are integral with the shaft, which is carried in three babbit bearings. The intake valves are operated through straight push rods, all valves being adjusted at the side the same as in a standard "L" head type motor.

Thermo-syphon water circulation is used, the water entering at the center of the left side of cylinder block and leaving from the front end at the top. There are large water jackets all around the motor and free water circulation around the spark plugs and valves. Lubrication is of constant level circulating system. The reservoir is in the pressed steel oil pan, which is readily removable, and due to the type of sod pan used is exposed to the air, which results in the oil being kept very cool. Gasoline is supplied through gravity system, the tank being located in the cowl. The filler cap is conveniently located under the hood.

The motor is designed so that any standard type of starting and lighting equipments with S. A. E. flanges can be mounted. Battery ignition is used. Any make of distributor using the S. A. E. standard distributor mounting can be used. Headlights are adjustable so that light can be thrown on the engine or along the sides of the car.

The clutch is an eight-inch, single disc,



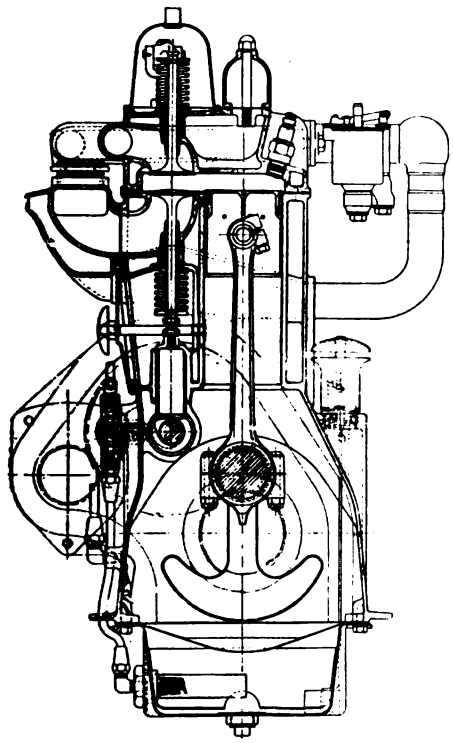
Back of Front Seat Swung Down and Foot Rest in Place, Forming Large and Comfortable Bed with Ample Room for Two Persons.

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dry plate, and the transmission is a standard, three-speed type, fitted with bearings and provided with a lock to hold the gears in reverse, making the car thief proof.

Another feature of the Pan is the design of brakes. The emergency brake is mounted on the rear of the transmission case and the service brake is on the rear axle, both brakes being internal and enclosed, making them practically dust proof. The emergency brake is 10 inches in diameter and 2½ inches wide. The service brake is 12 inches in diameter and 2¾ inches wide. The rear axle is of the three-quarter floating type and both front and rear axles are equipped with Timken bearings. The rear axle ratio used is five to one.

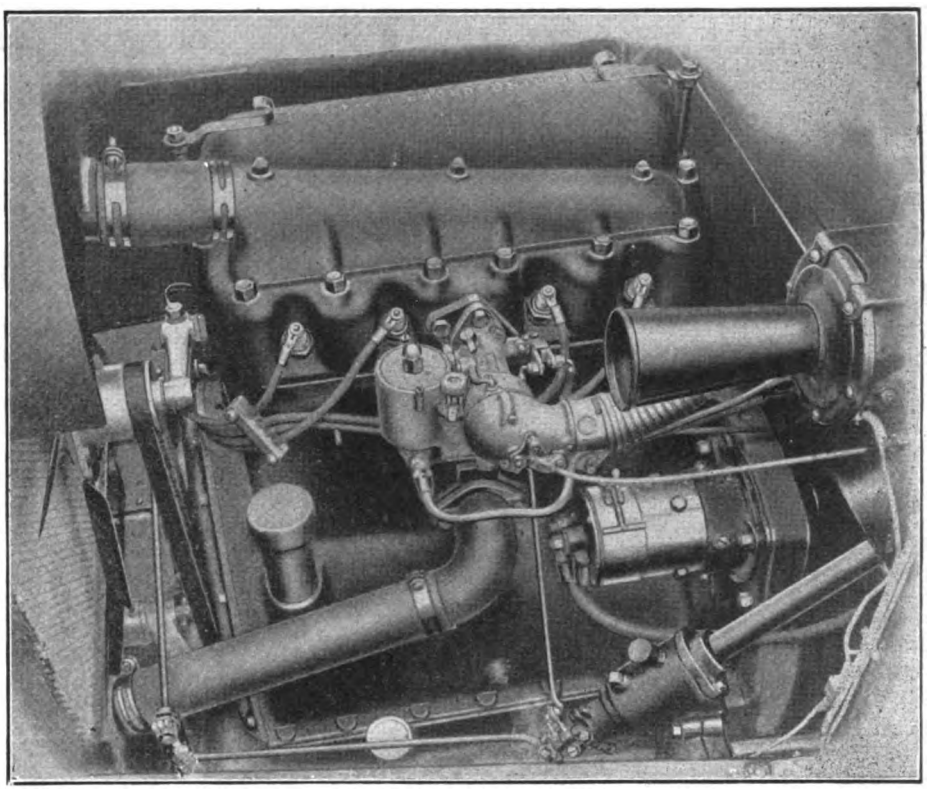
Spring suspension is semi-elliptic in front and semi-elliptic, employing Hotchkiss drive in rear. The front spring is 36 inches long and the rear 50 inches long. Spring center distance at the rear is 42 inches.



Detailed Drawing of End Section Showing Method of Crankshaft Balance and Carburetor Bolted Direct to Cylinder Head.

With the exception of the front axle spindle bolts and steering gear there are no grease or oil cups on the car, self-lubricating bushings being used throughout.

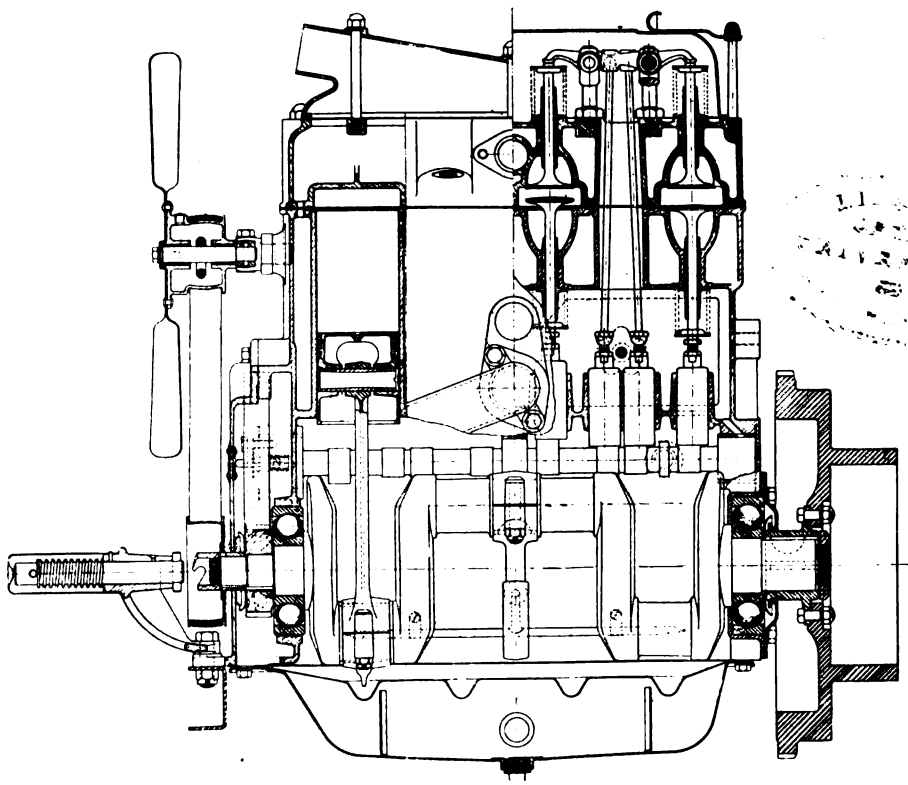
While the wheelbase of the car is 108 inches, owing to the compact motor and consequently the need of less engine space, the body has as much room as would be available on the ordinary car of 115-inch wheelbase. A rather unique yet practical feature of this design is the Pandolfo sleeping car body, which is so arranged that by turning two lock bolts the back of the front seat can be dropped down on a level with the rear seat cushion, forming a comfortable bed. The car is also equipped with the Pandolfo combination compartment tank at the rear, allowing one to carry a reserve supply of gasoline, oil and water. There is also a compartment for tools and a compartment for provisions, cold drinks and ice.



Pan-Powered Motor 45-50 Horsepower, Showing Small Size and Concentration of Equipment Where Readily Accessible.

The frame is of deep channel construction, being 6⅛ inches deep. A spare tire carrier of light, but rigid construction, equipped with a special tire lock, is also part of the equipment. The tires are 33x4.

Fully equipped the car weighs approximately 2300 pounds.



Sectional Side View Showing Large Main Ball Bearings; Large Water Jackets Around Valve Chambers; Camshaft and Valve Assembly Mechanism.

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Boy Scouts Take Motor "Hike"

Party of 50 Cover 2100 Miles In Big Goodyear Transport Trucks—Slept Enroute

A MOTOR "hike" of 2100 miles, the first of its kind ever attempted in America, has just been completed by a party of 50 Akron, O., Boy Scouts with their officers, through the generosity of P. W. Litchfield, president of the Akron Council of Boy Scouts of America and vice president of the Goodyear Tire and Rubber Co. of that city.

For several years it has been his custom to provide a summer outing for the scouts, usually in a camp, but this year the jaunt took the form of an extended tour through the East, following the Lincoln Highway to New York, then the old Boston Post Road from New York to Boston through New Haven, Hartford, Springfield and Worcester, returning through Providence, New London, New York, Philadelphia, Baltimore, Washington, Gettysburg and Pittsburgh. Two full weeks were covered in making the trip.

Five of the big trucks of the Goodyear Tire and Rubber Co.'s Akron-Boston express line, which operate constantly between Akron and Boston, carrying rubber products, were used to transport the party. Three of these, with special seating and bunking arrangements, hauled the scouts, while a fourth took care of the baggage and camp equipment, and a fifth, equipped with a military field kitchen, served as a commissary truck.



The Military Field Kitchen Stopped by the Roadside to Prepare Steaming Hot Meals.

The passenger carrying trucks were fitted with side seats, which at night could be folded, permitting the entire floor space of the truck to be used as a sleeping compartment. Mattresses were placed on the floor and comfortable sleeping quarters arranged. An upper row of bunks was provided by stretching a canvas sheet half way between the floor and the top of the truck. The three trucks furnished sleeping accommodations for the entire party of scouts and officers.

In addition to furnishing a tour for the scouts the expedition had for its objects the stimulation of interest in boy scout work and the demonstration to the government of the possibilities of transporting troops from the interior of the country to the seacoast by motor truck in times of emergency. The trucks were operated continuously, day and night, stops being made only for gas and oil and for meals. Just before meal time the commissary truck, which was capable of greater speed than the others, moved ahead of the caravan, selected an eating place and had the meal ready for the party by the time the other trucks arrived.

The party slept on the trucks while they rolled at night, apparently as comfortably as is possible in a Pullman. New York, 513 miles distant, was reached in 47 hours, and Boston, 785 miles from Akron, in 61 hours, the rate of speed for the total elapsed time being 13 miles an hour—twice the average speed that our army trucks are making in overland deliveries.

All of the trucks were equipped with big cord pneumatic tires, 38x7 front and 44x10 rear, and the cushioning they provided made riding very comfortable. The entire tour was remarkably free from mechanical or tire trouble, no tires having been changed on the three passenger carrying trucks, and only three instances of tire trouble on the others, all of a minor nature.



The Troupe Entering the White House at Washington, Where They Were Greeted by President Wilson.

Official notice was extended to the expedition at Boston by the mayor of the city and the governor of the state. After a tour of the city, including a visit to the navy yard, the scouts went into camp on the seacoast, 40 miles south of Boston, near Green Harbor, Mass., for five days. During this period several side trips were made, including one to Plymouth Rock, at Plymouth, Mass.

On the return trip stops were made in New York, Philadelphia and Washington for sightseeing. The climax of the trip came at Washington, where the entire party was officially received by President Wilson at the White House. The President showed a keen interest in the tour of the scouts, as it was related to him by Col. Colin Livingston, Washington scout official, and congratulated them upon their fine appearance and the wonderful opportunity they were having of seeing the famous historical spots of the East. "I wish I could take a day off and go with you," were his parting words, after he had shaken hands with each one of the party.

Returning from Washington, the Gettysburg battlefield was visited and a big U. S. marine parade participated in at Pittsburgh.

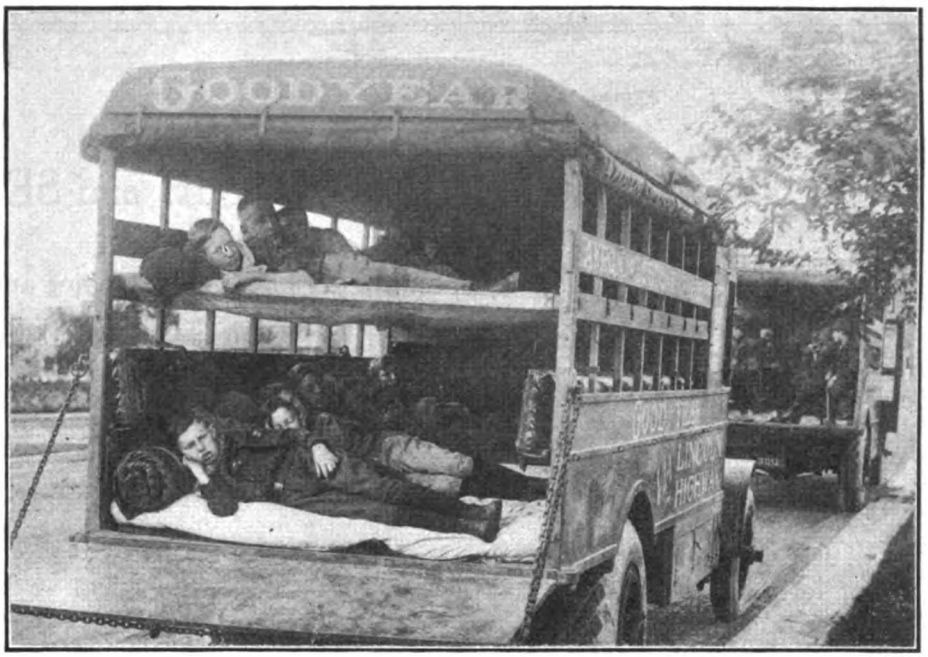
At the end of the 2100-Mile Tour the Boys Showed No Signs of Being Tired or Weary, but Arrived Back in Akron in High Spirits and Full of Enthusiasm.

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BOILERMAKERS WANTED BY U. S. NAVY.

The U. S. Navy Recruiting Service has issued a call for the enlistments of boilermakers for the regular navy (for the duration of the war). Men of this trade are especially needed. The present war pay for this grade is $77.50 a month and in addition to the salary the men are privileged to make special monthly allotments to dependents, which is paid by the government, and also can subscribe to the insurance which the Navy offers at a very low rate. The age limits are 21 to 35 years.

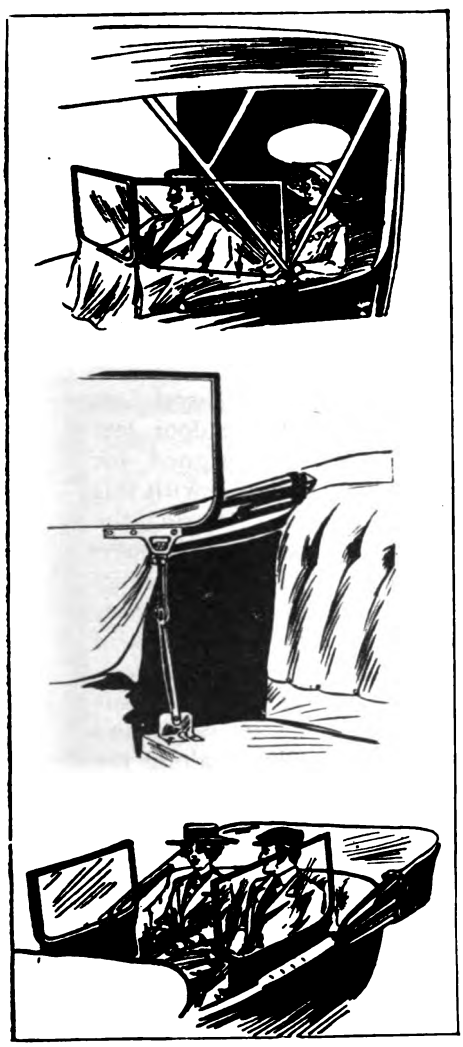
To enlist apply at any recruiting station or address Lieutenant-Commander Newton Mansfield, Recruiting Inspector, Eastern Division, 225-227 West 42nd St., New York City.



Showing the Bunking Arrangement in the Big Trucks, Which Permitted the Train to Continue Traveling While the Scouts Slumbered.

The Clark Tonneau Windshield eliminates the strong wind pressure and the clouds of dust which often envelop those on the rear seat. The windshield is easily attached without disturbing the upholstery on the car. When it is not in use it is turned back out of the way, but can be brought into service by a slight pull.

Manufactured by A. N. Clark & Son, Plainville, Conn. Write for prices and literature.



Clark Tonneau Windshield.

DESIGN AND CONSTRUCTION OF U. S. TWO-STAGE AIR COMPRESSOR.

The United States Air Compressor Co. of Cleveland, O., manufacture a complete line of air compressors in both the two-stage and single-stage types, comprising 20 different units. These units vary in capacity from 1½ cubic feet to 21 cubic feet per minute, and are capable of maintaining pressure up to 500 pounds.

The manufacturers claim that unusual efficiency is obtained by utilizing the two-stage principle. In support of this claim the experience of millions of automobile drivers is cited as evidence that the two-stage principle is superior to that of the single stage.

It is well known that whereas single cylinder hand pumps were in general use a few years ago, it is a very rare sight to see one now. This remarkable evolution is claimed to have been brought about by the superior construction of the two-cylinder (two-stage) hand pumps. It has been pointed out by the manufacturers, however, that in the design of U. S. two-stage air compressors, one weakness of the two-stage hand pump, namely, the stuffing box, has been completely eliminated; furthermore, their machine is improved in 14 important details.

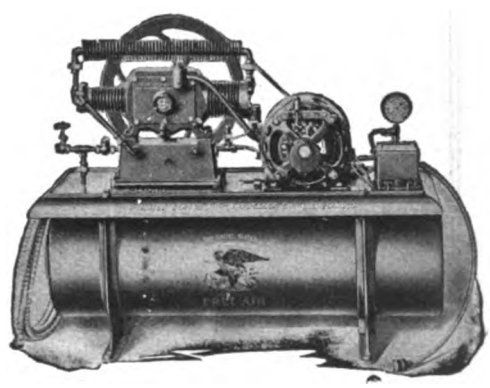
The operation of their United States two-stage air compressor is explained as follows:

One of the principal efforts of machinery designers is in the direction of eliminating resistance. The greater the resistance in any machine the lower the efficiency.

An air compressor continually operates against resistance and the unprecedented success of the United States two-stage compressor has been due to the fact that resistance has been reduced to the very minimum with a relative increase in general efficiency.

An air compressor must overcome the tank resistance at each impulse or its efforts are of no avail A single-cylinder (single stage) compressor takes air in at atmospheric pressure and forces it direct into the tank. The greater the diameter of the piston the greater the resistance to be overcome and the greater the possibility for piston leakage.

Now contrast this with the operation of the United States two-stage compressor: As the piston in low pressure cylinder moves to the left it takes air in at atmospheric pressure. On its return this air is forced through inter cooler into high pressure cylinder, being raised to 40 pounds pressure, the first stage. This



U. S. De Luxe Two-Stage Air Compressor.

piston now "steps up" the air again to a very high pressure twice; a small diameter piston instead of a large one works against the tank pressure; two power impulses instead of one are attained at each revolution; the crank is balanced between two bodies of air, which gives a cushioning effect, reducing the noise and vibration to a minimum.

A catalogue, describing the complete line of United States air compressors will be sent to any one who writes the United States Air Compressor Co., Carnegie Ave., Cleveland, O.

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PLATE XXV

GENERAL UTILITY GARAGE and SERVICE STATION

With Appointments For Small Dealer and Repair Business or For Housing Fleet of Delivery Cars

(Designed by the Architectural Department of the Automobile Journal Pub. Co.)

THE design in the accompanying plate meets the requirements for a small structure for a dealer in automobiles in a small city or town or for a garage to house and maintain a small fleet of delivery trucks for store service or other purposes. Its appointments are also suitable for public garage purposes in small cities or at summer places, affording facilities as it does for housing about 20 machines.

With a floor plan of this design the owner can make almost any rearrangement of the interior to suit his purposes. If it was to be used extensively as a repair shop the rear end could be readily changed into one large work room with space and pits for several cars by combining the wash stand space and tool room as one, or should it be desired for use as an automobile station and sales room the office could be extended back along the main wall, giving sufficient space for showing several models, as well as wall and counter space for an accessory and supply line. Under present conditions most dealers are endeavoring to handle as many different ends of the motor car business as possible as a means of cutting down overhead, as well as making up for those branches of the business that have become slack through the lack of products to sell. If, however, it was intended to confine the use of the building to that of housing cars alone, as this business might prove most profitable under some circumstances or in certain locations, even a smaller office than that shown would suffice and both the tool room and wash stand could be dispensed with to gain additional space for five or six more cars.

Built of brick with cement block trimmings and wooden roof, it makes a permanent and rugged structure, suitable for any climate. It is 35x96 feet, providing 3360 square feet of floor space, of which 660 square feet is occupied by the wash stand, tool room, coal bin, boiler room and office, leaving 2700 square feet for car space.

A solid foundation is very essential for this type of building and the foundation walls should be of concrete 20 inches thick and extending six feet below grade. They should also extend 18 inches above grade, forming an underpinning for the main walls, which are of brick, 12 inches thick. As shown in the elevation the front wall is carried above the roof line, improving the exterior appearance of the building.

The roof is supported by trusses built up of 8x12-inch hard pine timbers, which rest on plates of 5/8-inch iron, 12x18 inches, placed in the walls eight inches and laid 12 inches on centers. One and two-inch wrought iron rods are used in the construction of the truss, the larger sized rod being used at the center and the two smaller ones on either side of it at a point half way to the walls, giving the necessary rigidity and avoiding the use of posts to support the roof. The roofing unit is made up of 2x7 inch rafters, with 7/8-inch matched boards and three-ply roofing paper.

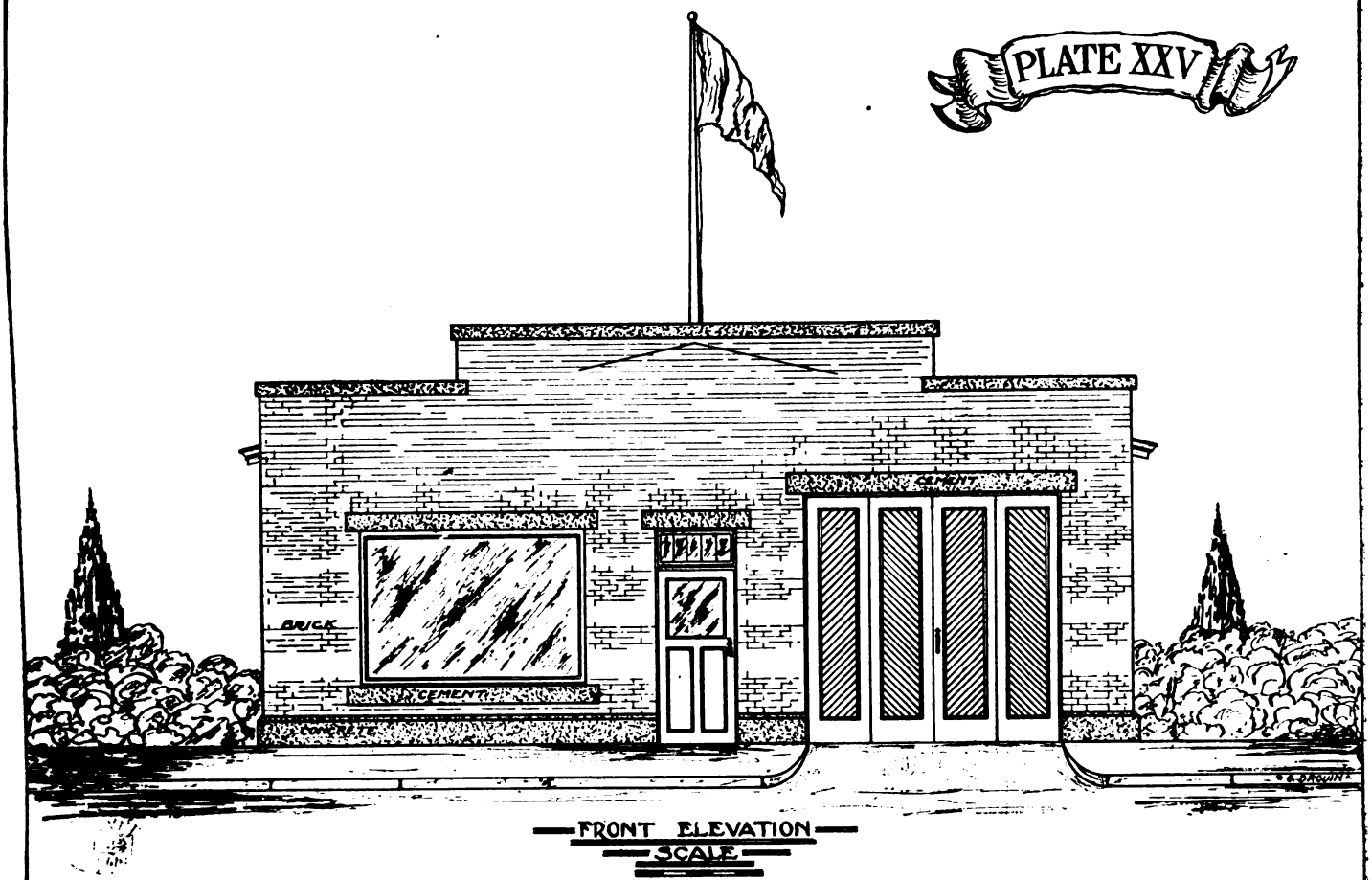
All the door and window lintels and window sills are made of reinforced cement. Owing to the inadvisability of having the doors swing out on a building of this design, the accordion or folding type of door, which swings in is the most appropriate, as they not only fold completely against the wall, require little space and very small clearance, but permit of the use of one of the center doors as a service entrance. They are weather tight and with the use of three butts on each door warping is prevented, and it is also guarded against by the use of strong steel foot and chain bolts. The Stanley garage door sets No. 1778 and 1779 are especially designed for these doors and when properly installed with this outfit should give no further trouble during the life of the building. The doors are easy to operate, as with the No. 1778 set each door swings on frictionless ball bearings fitted in weather tight washers between the grinding surfaces of the hinges and butts.

A small, but substantial heating apparatus is necessary in a garage with these dimensions and the radiators or pipes should be hung along the walls directly in front of and at the same height with the radiators of the cars when they are in their proper positions.

The cost of a structure of this type would vary considerably according to the location of the site, but in a city where building supplies are accessible the total outlay should not exceed $8000, including labor and finishings.

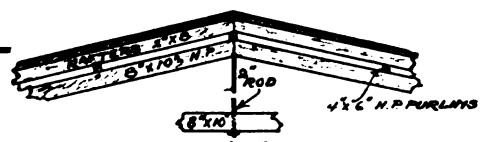
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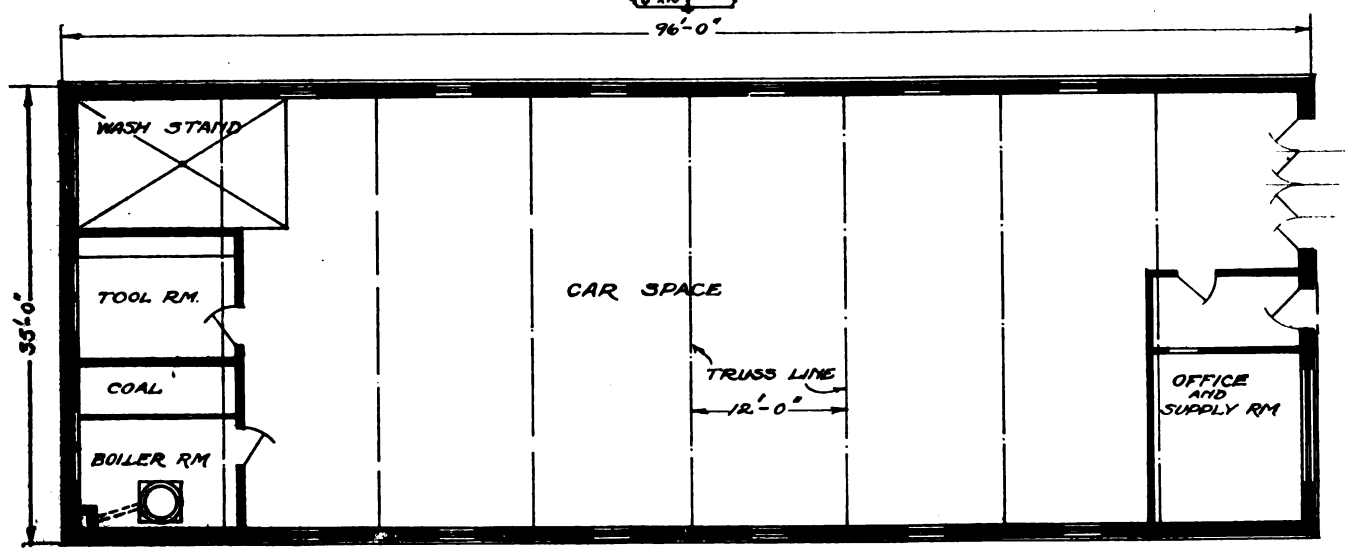
PLATE XXV



FRONT ELEVATION
SCALE

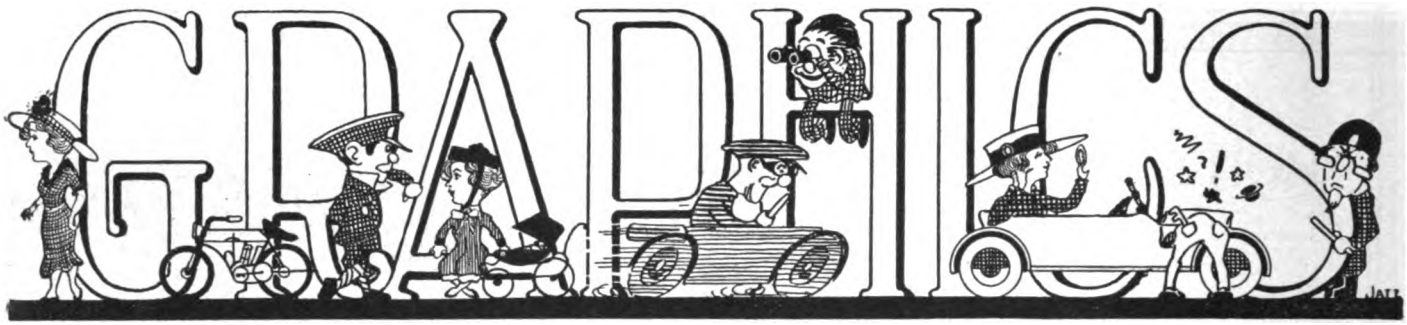
SECTION OF ROOF



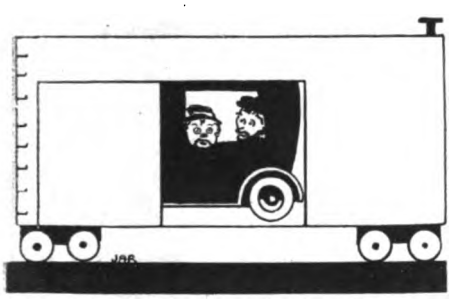


PLAN
SCALE

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It is truly a time of democracy and this spirit is pervading the entire country to an extent that even he "who toils not nor spins" is enjoying the luxuries of the table and travel that was once thought the exclusive perogative of the bloated bondholder and trust magnate. Weary Willie, the only true exponent of the simple life, has at last come into his own and on his frequent perigrinations no longer suffers the torments of car wheels clicking over the rails close to his ears, or the odious noise of ungreased springs and axles. At least these extraordinary changes have come about in the life of the hobo if we are to believe the New York Sun and, of course, in this case seeing is believing, as their slogan is "If you see it in the Sun it is so." Here is the story: "A Packard brougham was shipped to Earle C. Anthony, the Los Angeles dealer, in a closed freight car containing other



merchandise, including three hoboes. And it may be assumed that when three 'boes find themselves traveling across country with a luxurious passenger car they are not going to spend their sleeping hours on a shipment of horse shoes or drain tile. In this case they didn't. When the car was unveiled at Los Angeles it was very evident that the sartorial derelicts had used it for a traveling hotel. And as is customary with certain hotel guests, they annexed all movable articles, such as interior fittings, for later use. But they left the usual note. It read:

"Packard Motor Car Co.: We have just had a delightful demonstration ride in your lovely Packard limousine, and we are delighted with it. While it is true we did not see much scenery, the sides of the box car preventing, the vehicle rode very smoothly, with an unsurpassed degree of comfort, and the next automobile we buy will surely be a Packard. There is just one request we would like to make, and that is, that in the future your company build your limousines about six feet longer, as we found considerable difficulty in three of us sleeping comfortable in this bed at one time.

"A PACKARD TOURIST."



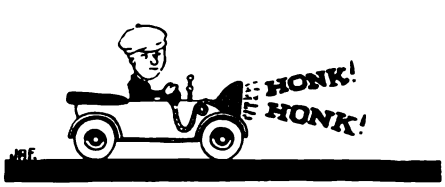
A doctor of the female sex in a Connecticut town in order to get a party of her friends to a departing ferry boat on time virtually perpetrated a barrage on the automobile laws of the place, including in its effect both the legislative as well as executive departments, as she not only shattered the speed regulations, but rendered the traffic cop "hors de combat" by touring over his person in a north to south direction without stopping to see if the non-skid tread on her tires had left the manufacturer's trade mark tattooed in mud along the cheek of the human obstacle.

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James W. Synan of the Massachusetts Highway Commission is of the opinion that the too liberal use of the horn is responsible for as many accidents as the too frequent neglect to use it.

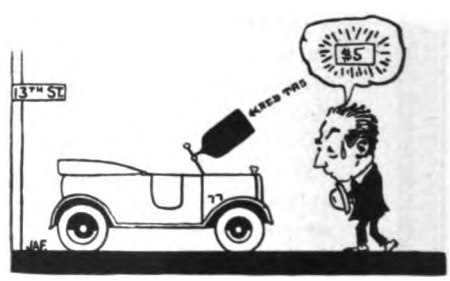
"Fewer persons would be knocked down in the roadway if the man at the steering wheel were to drive slowly and carefully, rather than to continue at ordinary speed and depend for safety upon the honking of a horn," said Mr. Synan. "In virtually all of the cases coming before the commission the contention is put forth that the motorist made good use of his horn. Nevertheless accidents occur every day.

"In many cases the honking of a horn not only warns a person, but startles him. Take the case of three or four children at play in a street. Along comes an auto at an ordinary clip. The youngsters are intent at their play. Undoubtedly they are moving about but not toward the center of the street. When an auto is within 10, 20 or 30 feet they



hear the honk of a horn. At the same moment one of their mothers, or several hears it. Cries come to the children to 'look out' or 'come here.' If a child is on the opposite side of the street he instinctively crosses to his mother; else the mother darts out to protect him. Then the accident occurs.

"These cases among children, and, I might add, among aged and infirm people, naturally nervous, could to a large degree be eliminated were the autoist to think less of sounding his horn and more to driving slowly. It is significant that accidents never occur when a machine is being driven at a low rate of speed. They never occur for the reason that the pedestrian has ample time to get out of the machine's path or the autoist to come to a complete stop before striking anyone. Should this precaution be observed by drivers of cars there would be a striking falling off in the number of this kind of accidents."



The police of Norwich, Conn., will no longer be made the butts of jokes perpetrated by keen witted motorists and have turned the tables on the latter as it were and again demonstrated the proof of the old adage that "he who laughs last, laughs best." It had been a custom for some time for the policemen to go to a car that had been standing in restricted space over the prescribed period, and stand there until the owner arrived, when he was escorted to the police station. Several wags discovered the possibilities of a very practical joke in this system and upon returning to their machines, if a policeman was in attendance, they returned to their dinner or supper as the case might be and came back five or six hours later to see if the policeman had become tired of his job and given it up. It was not long before the minions of the law discovered this imposition on their vigilance and invented a little tag game in which the motorist is usually "it.' Each policeman was supplied with a plentiful supply of large red tags and when he finds an offending

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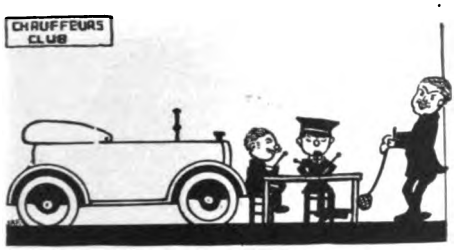
car he literally tags it, as the card reads:

"Police Department, City of Norwich, Car No. ———. Driver will report to police headquarters at once."

So that there will be no misunderstanding on the part of the owner or operator the complaint with which he is to be charged is written on the back of the tag.

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From dodging street cars, jay wakers, traffic cops and other numerous obstacles on the New York streets while hitting at anywhere from 20 to 40 miles per hour down to "purling," "turning the heel" and other delicate yet intricate



operations of knitting, is the change of life that has come over the New York chauffeurs. They not only hold regular knitting sessions at their club houses in place of the one-time famous African golf and America's foremost indoor sport commonly known as draw poker, but may frequently be seen in the act of creating a sock while idling at the curb.

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The puritanical code of ethics of the natives at Compo Beach, near Westport, Conn., suffered a rude shock one moonlight night not long ago when they rubbed their eyes in wonder at the sudden change in the forms of a party of bathers disporting in the surf. At first everything appeared conventional, but suddenly the venus like forms that had previously graced the beach in natty bathing suits appeared in skin-tight jerseys and trunks, while the more corpulent and masculine forms were silhoutted against the moonlight with skirts, headgear and flounces that belied their sex. After a brief period of jollification in



the swapped uniforms the party disappeared into an automobile that was parked on the sand and soon drove off in regular street attire. The unsophisticated were later informed that instead of an unusual lark they had only witnessed a motor party taking a moonlight plunge on the surf, which amusement has become a fad along the coast.

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Statistics just compiled, covering traffic upon the Lincoln Highway, near State Center, Ia., indicate that travel at this time is exceptionally heavy. According to the traffic enumerator stationed upon the highway just to the west of the city, a total of 1707 vehicles passed along the road during 98 hours—an average of more than 17 an hour. The count was taken covering a period of one week, during the first five days of which the weather was rainy and the road was muddy and rough, tending to discourage travel.

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Officials of the Mexican government are negotiating with Henry Ford for the construction of a tractor building plant in Mexico. It is proposed to operate the factory with Mexicans, who will at first be given a course of mechanical instruction at the Fordson plant at Dearborn, Mich. Pastor Rouaix, secretary of agriculture of Mexico, who has recently been staying in New York City, made a two months tour of the farming sections of this country and made a study of methods and farm machinery. He paid a visit to Detroit and while there Henry Ford presented him with a Fordson tractor, painted in the national colors of Mexico.

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In these days when conversation begins with "Isn't it hot?" and leads to a discussion of ways and means to keep cool, it is with envy that we read of a spot in Cleveland that has been transformed into a veritable Iceland. The Rainbow Room, that famous restaurant of Cleveland's newest hotel, the Winton, has installed a large platform of solid ice on which the country's most famous skaters appear in an ice carnival, both noon and evening.

Attentive to the comfort of its patrons, the management has installed an elaborate system whereby all air entering the Rainbow Room is washed over ice and by this means an even temperature of 70 degrees is maintained.

The pleasure of dining in such an atmosphere when heat waves outside are causing prostration is further added to by the excellent music of Paul Biese and his famous Chicago Novelty Orchestra.

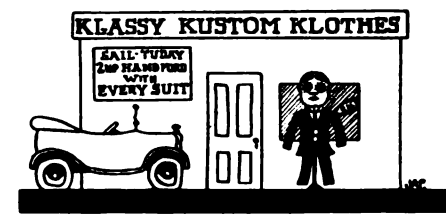
The ice carnival program is led by Norval Baptie, the world's champion ice skater, and his charming partner, Gladys Lamb. Among the other artists should be mentioned Romayne, a niece of Billie Burke; Loos Brothers, singers of the latest popular songs; St. Pierre, a grotesque, but clever comedian, whose antics on the ice create much laughter; Smith and Russo, two charming young girl skaters.

Motorists visiting Cleveland will find the Hotel Winton a most delightful "home" and the Rainbow Room a restaurant where one may dine pleasureably while enjoying the ice carnival.

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Linking the Ford car up with a sales proposition has always proved very alluring and profitable, but occasionally these attempts at jumping into a fortune have brought the reverse effect. A clothing dealer on Long Island readily reasoned that if he could only give a flivver with each suit his future would be assured, but as this seemed impossible after a few dashes with the pencil he hit upon the next best thing and offered a chance to own one with each purchase. Here is where a brilliant business genius miscalculated, as he landed in court with an opportunity to deny the evidence charging him with violating the law, which evidence read as follows:

"Wearers of Klassy Kustom Klothes—Opportunity Invites You. If you are one of those Particular Men who realize that success in approaching the Customer often hinges on the First Impression created by the Salesman you shall not hesitate in Placing your Order with this First Class House. A Klassy serge, pin check or Palm Beach suit with belted-in



back, diagonal pockets and turned up cuffs with pearl (genuine) buttons. All at the sacrifice price of $1 a week for 35 weeks. With each order there is issued a numbered card. Whenever the number on your card corresponds with the last four numbers of the Monday evening reports of the New York Clearing House of the Banking Exchange you get a

"FORD CAR FREE.

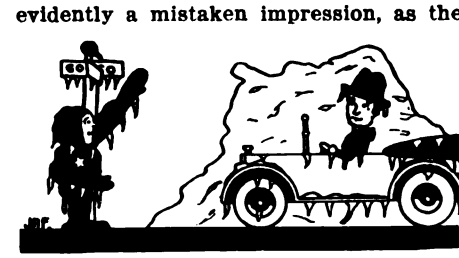
"Place your order now and by keeping the wheels of industry turning

"HELP WIN THE WAR."

Reading this circular, which was well circulated among the trade, it does not seem that the chance on a flivver was necessary as an inducement to wear Klassy Kustom Klothes, as it certainly speaks for itself, and any motorist should be proud to wear a suit answering the description given.

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Iceland, the "land of the midnight sun," is generally thought of as a country where most of the facilities of civilized countries are unknown, but this is evidently a mistaken impression, as the



natives are taking to the motor car at a rapid rate. Only $1000 worth of automobiles and automobile accessories went to Iceland from this country in 1913, which would mean at the most, two cars and a few tires, while last year the imports were valued at over $10,000. There is no reason why motoring should not become the most popular sport in that country, taking into consideration the geographical facts connected with it, the motorists having the advantage of days six months long in which to tour in and nights of the same length of time in which to joy ride.

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Inventorying the Motor Woman's Wardrobe

Odds and Ends of Last Summer's Millinery

By MRS. A. SHERMAN HITCHCOCK.

THIS is the season of year when the motor woman takes an inventory of the odds and ends of her last summer's wardrobe, which she has kept carefully put away in a special closet, her secret base for economy and smartness. There are always quite sure to be several hats of assorted shapes and sizes. She is very apt to have one or two of these hats reblocked, and, if she is wise, she will select one for recoloring. There is an excellent process by which she may do this recoloring and I am going to disclose the secret. The hat to be colored is spread out on a flat surface and painted with sealing wax dissolved in alcohol. If the hat is dark it will, of course, take only the darker shades of this dye, such as purple, dark blue and green. The dye is very easy to make; one has merely to dissolve enough ordinary sealing wax of the desired color in alcohol to make a solution thick enough to cover evenly the natural color of the hat. This is painted on in even strokes with a rather stiff brush, and besides coloring the hat, this treatment gives it a renewed stiffness and renders it practically water proof. The advantage of this dye over the commercially prepared ones is that it is possible to produce softer and more subtle shades, which are unusually becoming and quite exclusive.



Since fruit trimming on motor hats is so greatly favored this season, the motor woman can use it to decided advantage on any hat of her own trimming. Kid fruits, those charming little apples, plums and other nameless fruits that appear in bright colors on the smartest of millinery, are sometimes quite short lived and after they have faded and become shabby they may be painted with the opaque water color known as "tempera" paint, which comes in tubes in the vivid shades that are so smart this season. After the tiny fruit and leaves have been painted and dried a porcelain effect may be obtained by giving them a coat of shellac. This gives the fruit a charming glaze and keeps the paint from peeling off or cracking and also makes them high in fashion's favor.



Every one of the noted designers are endeavoring to create the ideal costume for women to wear both for motoring and aviation and it is due to the inspiration and ingenuity of the wonderful Grean to originate the model that has been taken up with avidity and named the "Escadrille" costume. It is made of beaver satin in dust color and is so constructed that it may be worn in three different ways.
(Courtesy Alexander M. Grean, New York City.)

The inevitable reaction against false economy in the buying of clothes has been followed by an equally sensible reaction against the use of unnecessarily and depressingly somber color schemes. While khaki color and olive drab and the various military shades of tan are often used as the predominating tones, brilliant touches are introduced in many delightful ways. While there are so many charmingly colored fabrics and garments for motoring wear to be had, dull monotony in motor dress really has no excuse for being. And even when one dark tone is used it is often relieved by gayer brightening colors. Not within the memory of any one who reads this article, if ever at any time before, have motor garments or materials for making them been so interesting as they are today. Of course all fashions are based on the exigencies of war; it has always been that the matter of importance was to dress women; man was clothed in whatever was left. But today, man, the warrior of the world, must first of all be garmented in such a manner as to resist cold and wet, and woman must be clothed in what he does not need.

I am bringing to your attention the new Escadrille costume, which made the most wonderfully popular sensation at the Fashion Show recently. It is the creation of Alexander M. Grean, America's foremost designer, who has given to motor women many garments of great excellence designed expressly for her use. The Escadrille costume is built of beaver satin, which possesses unusual wearing qualities, as well as great beauty and a fine adaptability to manipulation. It is in dust color and is composed of a tight fitting hood helmet, a union suit of very new and interesting construction requiring scarcely any fastening devices—the knickers and waist part being joined and held together by overlapping bands and belt—and a pointed cape which has elastic at the top and may be used as a skirt when desired. Another garment, which will be greatly appreciated by the motorist, is called most appropriately a "War Habit," and is also one of Mr. Grean's creations. It has been especially created to aid the government in conserving the wool for our boys "over there." It is a sleeveless, reversible garment to be worn over any kind of blouse or guimpe. It is made from one piece of double width material, 1¾ long. It has no seams, no hooks, no



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buttons and takes less than a minute to put on and take off. It can be worn inside out, the front in the back or vice versa, thus making four different exclusive styles in one garment.

The beaver satin of which the Escadrille costume is made, is one of the best materials for motoring garments of any kind. They possess an exquisite luster, are soft and pliable in texture and wear



The slipover sweater has won a well deserved place in the affections of the woman motorist and here is one of the very handsomest of the season. It is hand made of the Minerva yarn, which combines an excellence of quality and beauty not easily equaled. The charming little motoring hat is also hand made and both hat and the crocheted flowers that adorn it are made of Minerva yarn.

most satisfactorily. There is no material which will be higher in fashion's favor this coming fall than satin and all kinds of garments will be fashioned from it. The motor woman needs materials which will endure hard wear when necessity demands and still retain their attractiveness. This is just the service which beaver satin will give. It has been manufactured with a keen appreciation of real every day needs. On account of the wool conservation motor coats will be made of satin for fall and winter, warmly interlined and heavily trimmed with furs, and in some cases lined with fur also.

Now that we are bound to get the cool evenings—and are approaching the fall season so rapidly, the sweater of wool is in very great demand. It is a garment which is really an absolute necessity for the motor woman, so that she need not feel in having one that she is in any way unpatriotic. Uncle Sam does not demand that we deny ourselves the necessities, only that we shall not be extravagant with them. The motor woman should be most particular in selecting the best quality of yarn with which to knit her sweater, as only the best gives satisfaction later. There are some lovely models illustrated, made of the Minerva yarns. The directions for these garments are easily obtained and there are the most exquisite shades in the Minerva yarns. For the warm, heavy type of sweater the four-fold Germantown is used; for a more dressy affair the Vicune is the better choice, on account of its beauty and sheen. Shetland and Zephyr floss are lighter in weight and in consequence fit closer when made up and carry an extreme amount of fashion value. Pink, Nile, chamois, spray, peacock, lavender, American Beauty, coral, turquoise and tan are among the most lovely of the Minerva yarns, while there is an unusually varied range among the standard and best liked shades. It is a yarn to be very highly recommended.

Something which every motor woman will be delighted to know of and make immediate use of is the very new tubular woven ribbon for girdles of motor and sports apparel and one-piece frocks. Many a motorist has felt discouraged by a stringy belt or girdle, which really spoiled the appearance of the garment. This new tubularly woven ribbon is one of the well known "Regatta" products, and imitates a knitted fabric. It is about 4½ inches deep and it is possible to purchase just the yardage desired—whether one wishes to wear it doubled about the waist or otherwise, at a price not at all exorbitant, and tassels or fringe may be added to the ends, or fancy ends made out of the fabric itself. The tubular ribbon comes in 11 shades, all new and charming. It is so woven that it will not stretch, as is the case with the regulation sports girdle. Another very desirable feature is that it will not crush down, but will always keep its regulation depth. For motor frocks, separate skirts, sweaters, sports coats and the new sleeveless coats these tubularly woven girdles cannot be recommended too highly.

The Pettibocker has established itself as one of the most practical and essential garments in the entire wardrobe of the motorist. For the woman who drives it is a particular valuable acquisition,



No smarter model could be imagined for the motor woman than this hand knitted one of Minerva yarn. Its originality, combined with its attractiveness, serviceability and quality of yarn, makes it a leader among high class garments of this character.



"The Sunshine of Her Smile" may be due to anticipation of a motor tour, or it may be that she is so pleased with her smart and becoming hand-made motor hat and sweater, which, worn with a patent leather belt, is certainly the acme of perfection along these lines. Both the sweater and hat are made of the beautiful Minerva yarns.

doing away as it does with all petticoats, which are really such a nuisance about a woman's feet when she is in the driver's seat. The Vanity Fair Pettibockers is a petticoat in frilly appearance and a knickerbocker in comfortable reality.

Veilings are becoming a mania with motor women who do touring and the colors are many and beautiful. Some of the most popular tones are vivid, embracing all the Bulgarian shades, but all colors cannot be worn by all motorists. The new Cascade blue, the green tones, the reds, which include the very new Marriane, Satanas and Cardinal, the glowing tangerine and pinkish yellows are in themselves slightly spectacular, but they are all used by smart motorists, while the softer tones, the Ether and Chinois, blues, the Roseau and Chartreuse greens, the Zoulon brown, the Jacinthe purple, the melting yellow and rose tints and the beige and gray tones are all lovely and always in good taste and are favorites with the conservative motor woman.

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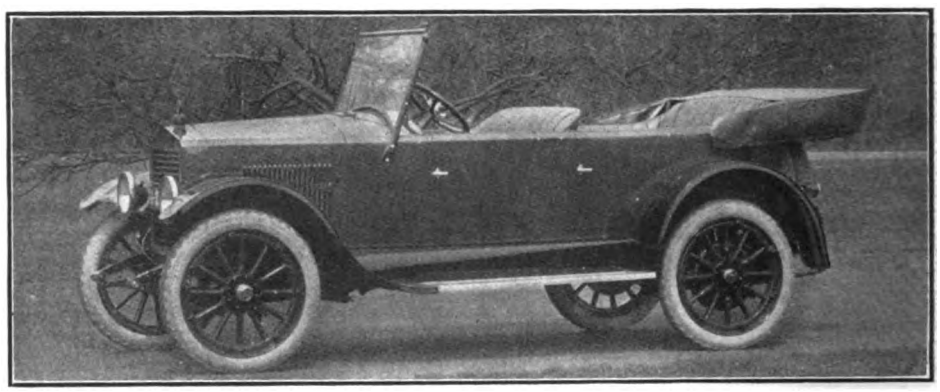
The Essex---A New Car in a New Class

Built in Hudson Factory and Sold by Hudson Dealers

Last fall, when it was announced by the newly organized Essex motors that it would have a new car for the market this summer, there was considerable speculation in the trade as to what the new model would be and additional interest was manifested in the announcement because the directors of the new company are also officers of the Hudson Motor Car Co.

None of the details of the new design that would be marketed as the Essex were made known to the public or trade until recently, when Hudson distributors were called to Detroit to see the finished product. The Hudson and Essex organizations, however, are to be kept separate, but the fact that the Essex is to be built in the Hudson factory and sold by Hudson distributors and dealers gave the new car a substantial standing at the outset.

The particular claim made for the Essex aside from its mechanical features is that it enters a market field not now filled by any other car and was designed to meet a definite demand for a car combining the advantages of endurance, safety, comfort and performance, which were features formerly confined exclusively to the higher priced cars.



Essex Five-Passenger Touring Car Has Striking Lines.

SPECIFICATIONS OF ESSEX.

BODY—Five-passenger touring car. Price, $1395.

MOTOR—Four-cylinder, cast in one block, 3⅜x5 inches. Intake valves in head. Exhaust valves in side. Length over all 29 inches. Carburetor bolted to intake manifold, which is contained in cylinder head. Entire combustion chamber machined. Flow of gas from carburetor downward through cylinder head, assuring complete and uniform distribution of gases into each cylinder and perfect combustion. Makes easy starting in cold weather and takes care of low grade fuels.

GASOLINE SUPPLY—Vacuum type. Gasoline tank in rear carries 13 gallons and is protected by frame extension. Automatic gauge indicates quantity fuel in tank. Gasoline mileage comparable to that of cheapest, lightest cars.

CRANKSHAFT—Special design, scientifically counter balanced, giving perfect static and running balance at all speeds. Crankshaft distortion is eliminated. Permits higher motor speed.

Three heavy bearings, front 2 1/16 inches diameter by 2¼ inches. Center bearings 2 3/32 inches diameter by 2⅛ inches. Rear bearing, 2⅛ inches diameter diameter by 2⅝ inches.

Cams are integral with shaft, extra large diameter run in four nickel babbit bearings.

TIMING GEARS—Helical of wide face. Tooth cut at angle, which assures quiet operation.

Thermo-syphon water circulation.

LUBRICATION—Constant level, circulating splash. Reservoir made of sheet steel bolted to base of crank case. Air cools oil, insuring thorough lubrication and increased mileage.

Pressure gauge located in cowl apron indicates oil pressure and condition of oil circulating system. Flow of oil through motor is controlled by stroke of oil pump connected with throttle.

CARBURETOR—Special Essex design, patented, improved type self-adjusting, yet controlled by dash arrangement with strangler for starting.

IGNITION—Starting and lighting. Delco, two separate units.

CLUTCH—Multiple disc contained in oil tight case in center of flywheel. Two sets of discs, both of steel. The driving discs having cork inserts.

Clutch is of proved reliability, gives long service, soft in its engagement, with consequent minimum shock to transmission and rear axle.

TRANSMISSION — Selective type, three speeds forward and reverse. Direct drive third speed. Transmission is bolted direct to rear of motor, making unit power plant. Assures perfect alignment between crankshaft, clutch and transmission. Large size roller bearings used throughout. Security lock is provided to lock gears in neutral position.

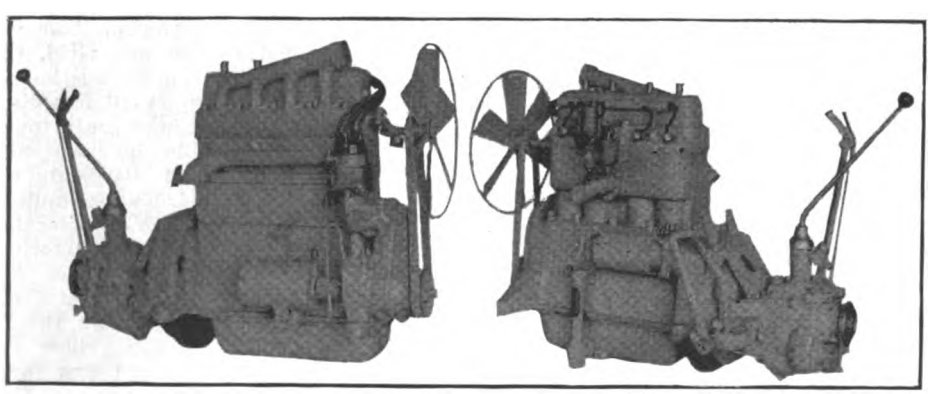
STEERING GEAR—Worm and gear type. Full gear and shaft in one piece. Adjustable to take up wear, both worm and gear.

DRIVING SHAFT—Designed for lightness and strength. Carries two universal joints. All working parts are packed in grease and protected by grease tight steel covers. Ample lubrication assured at all times.

REAR AXLE—Conforms to latest European and American practise. Light, strong and of proved satisfactory performance. Housing is of reinforced pressed steel, much stronger than ordinary tubing and cast type. Driving gears and differential mounted on separate carrier, which is bolted to axle housing and is easily removable without taking axle from under car. Driving gears are of helical type.

BRAKES—Unusual provision for car of its weight. Brake bands 14 inches (35.5 cm.) in diameter and 1¾ inches (4.45 cm.) wide.

RADIATOR—Cellular type provided with shutters, controlled from dash. Equipped with motometer. Enables driver to know and control heat of mo-



Showing Both Sides of the Essex Engine, an Extremely Neat and Compact Power Plant.

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tor at all times. Further contribution to motor efficiency and fuel economy.

WHEELS—12 spokes, front and rear, made of hickory. Carry tire 32x4 inches. Detachable rims.

SPRINGS—Provide extreme easy riding qualities. Semi-elliptic type both front and rear. Front springs two inches wide by 36 inches long. Rear springs same width, 54 inches long.

Springs assembled with graphite grease between leaves.

Spring eyes equipped with phosphor bushings. Adjustable to take up all side wear, eliminating rattles. Hotchkiss type drive.

FRAME—New design, strengthened at front and rear by tubular cross members. Power plant bolted direct to frame cross member at rear. Frame six inches in depth at points of greatest stress. Assures absolute rigidity. No feeling of frame weaving or insecurity is noticeable even on roughest roads. Prolongs life of car and contributes much to comfort.

WHEELBASE—108½ inches in length.

BODY—Compactness of motor provides ample space to carry commodious body without undue lengthening of chassis. Streamline in design, beveled edges, squared corners of radiator and body.

TOP—Made of rain proof material, equipped with minute adjusting curtains, one man operation.

LIGHTS—Light equipment includes parabolic headlights with dimming attachment. Instrument light and tail light are controlled from dash. Switch is equipped with security lock and keys.

INSTRUMENT BOARD—Carries in addition to ignition and lighting switches, oil pressure gauge, speedometer, carburetor, adjustment for strangling and ventilator control.

OTHER FEATURES ARE—Electric motor driving horn, located under hood operated by push button, center of steering gear. Windshield integrally mounted on body with permanent standards. Lower sash stationary. Upper sash movable outward. Ventilator in top of cowl controlled from dash, provides ventilation in front compartment. Equipment includes tools, special wrenches, oil cans, quick acting jack, hand pump, etc.

STEVENS "WAR TIME ECONOMY" CATALOGUE.

At a time when the motorist and dealer are squaring up their purchases with war time economy—avoiding frills and adhering strictly to accessories that make for increased efficiency and comfort in motoring—a catalogue like that now being issued by the house of Stevens & Co., 375 Broadway, is of unusual merit and timely interest.

More than 200 motor necessities are interestingly described in the new Stevens book, which is replete with bright and informative illustrations. There are 64 pages devoted entirely to Stevens products and among these accessories for Fords are prominently displayed. A copy of this new catalogue will be mailed to any dealer on request.

Picnicing in the Motor Car.

UTENSILS FOR COOKING AND PRESERVING FOOD.

THE influence of the motor car is indeed far reaching. Nowadays nothing seems complete without the presence of the motor car. Now it is the old fashioned picnic which is transformed into a new fashioned one with the aid of the motor. That it is a vast improvement upon the old picnic goes without saying. The distance to be traveled is so much greater, to say nothing about the convenience and comfort in reaching the desired place. Motor picnics this summer are all the rage. They are the pet diversion of her Motor Ladyship. With the coming of summer the motorist longs to spend whole days in the open air, basking in the warmth of the sunshine and breathing in the freshness and sweetness of the blossom scented air.

Early in the spring it is all very well to stop at a hotel or club house for luncheon, but when summer comes the motor woman enjoys spreading the luncheon on a flat rock where she can sit and gaze at the grand old ocean, or perhaps using the soft green grass as her table under the inviting shade of some noble trees. The very latest thing among the motorists is to give a motor picnic and those invited are all packed into the big touring car or, if the picnic is to be a large one, other cars are called into service with perhaps some roadsters and runabouts just "built for two."

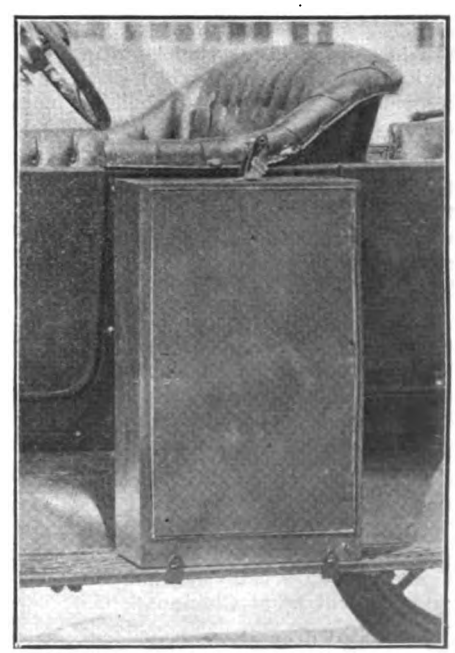
The manufacturers of motor hampers, motor camping outfits and utensils to be used for motor picnics, have given their attention to the necessities of the motorist and brought forth all manner of conveniences for those who follow the call of the great outdoors. Motor hampers can be purchased either in leather or in wicker and come in several shapes and sizes with equal varying prices. They are built very complete with a "place for everything and everything in its place." The Hawkeye Basket Refrigerator is a very unusual article and was built particularly for the motorist. It is so excellently made that with reasonable care it will last many years. Metal name plates may be attached which makes the basket very individual. There are several different styles of the Hawkeye, from the one designed to fasten to the footboard of the car to the "De Luxe" basket of more pretentiousness. They are all made with an ice compartment and a small piece of ice will keep the contents cold for 24 hours. The various other compartments will enable the motorist to carry sandwiches and salads, which will be fresh and appetizing, cool, fresh butter, etc. The remarkably reasonable price of these splendid baskets makes them particularly desirable.

Another outfit that is new and highly desirable for the motorist is the Mirro Aluminum Camp Outfit. It consists of one six-quart pan, frying pan, bowls, cups and saucers, plates, salt and pepper shakers, knives, forks and spoons, all of the lovely and durable Mirro ware with which nearly all discriminating women are familiar. The complete set nests into a small package and fits into a khaki bag. The shakers are equipped with extra unperforated caps to prevent spilling, the frying pan handle is detachable and everything has been carefully thought out to ensure the most satisfactory results for the owner.

The Refrigo Auto Chest is a portable refrigerator that can be carried inside the automobile or upon the running board. The makers guarantee it to be insulated, air tight, sanitary and dust proof. When touring or camping this chest is invaluable for keeping the eatables cold and fresh for an indefinite length of time.

Manufactured by the Refrigo Auto Chest Co., Iron River, Mich. Write for prices and literature.





The Refrigo Auto Chest and Same Attached to Running Board.

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Personal News of the Industry in Brief

W. J. (Bill) Slater has resigned as pneumatic tire sales manager of the Firestone Tire and Rubber Co. to become general sales manager of the Williams Foundry and Machine Co., Akron, O., the largest makers of tire building and repairing equipment in the world.

Mr. Slater's connection with the Firestone company covers a period of several years, during which time he was successively manager of advertising, sales promotion and pneumatic tire sales.



Chester I. Campbell Will Manage N. A. A. A. J. Show in Chicago.

Chester I. Campbell, the well known director of the automobile shows at Boston, has been placed in charge of the exhibition that is to be held in Chicago this fall under the auspices of the National Association of Automobile Accessory Jobbers. Decorations for the show will be furnished by the Atlantic Decorating Co. of Boston, of which Mr. Campbell's brother, E. W. Campbell, is manager.

S. Deutsch has been elected vice president and director of the Signal Motor Truck Co., Detroit. He will have charge of production and sales. He was formerly vice president of the Clus Manufacturing Co., Milwaukee, Wis.

E. F. Howells, formerly Philadelphia manager of the Chase Motor Truck Co., has been appointed district sales manager for the Sanford Motor Truck Co., Syracuse, N. Y. His territory will include New York and Pennsylvania.

J. H. Quinlan is now division sales manager of the Selden Truck Sales Co., Rochester, N. Y. He will have charge of Selden sales in Southern Ohio, Indiana, Kentucky and West Virginia. His headquarters will be at Cincinnati, O.

George Effros has been appointed southern district sales manager for the Sanford Motor Truck Co., Syracuse, N. Y. He will have charge of territory in the states of Tennessee, Mississippi, Arkansas, Alabama and Louisiana.

E. W. Hurd is now director of sales of the Premier Motor Corporation, Indianapolis. He was formerly assistant sales manager.

J. C. Manternach has been elected president and general manager of the American Welding and Manufacturing Co., Warren, O. Mr. Manternach was formerly manager of the rim and tube division of the Standard Parts Co.

Fenn H. Hossick, assistant advertising manager of the Nash Motors Co., Kenosha, Wis., has resigned to take up special work with the Motor Equipment Section of the Ordnance Department.

T. L. Loose is now manager of the Canton spring and axle plant of the Standard Parts Co., Cleveland, O. He was formerly with the Hendee Manufacturing Co., Springfield, Mass. Mr. Loose succeeds J. B. Childe, who has been transferred to the Cleveland offices of the company.



W. J. (Bill) Slater, General Manager Williams Foundry and Machine Co.

W. L. Woodward is now manager of the rim and tube plant of the Standard Parts Co., Cleveland, O.

L. C. Sprague has been appointed special representative in connection with the sale of pneumatic tools to railroads by the Chicago Pneumatic Tool Co., Chicago, Ill.

D. C. MacDonald, formerly manager of the Akron branch of the Mason Tire and Rubber Co., Kent, O., is now with Company H, 315 U. S. Infantry.

W. E. Hutchison, formerly purchasing agent for the United States Ball Bearing Co., has succeeded E. F. Oberlin as manager of purchases of the Denby Motor Truck Co., Detroit, Mich.

Lewis Ford is now associated with the Freeman & Freeman, Little Rock, Ark. The firm has contracted for 1000 Fordson tractors and was given the agency for Arkansas.

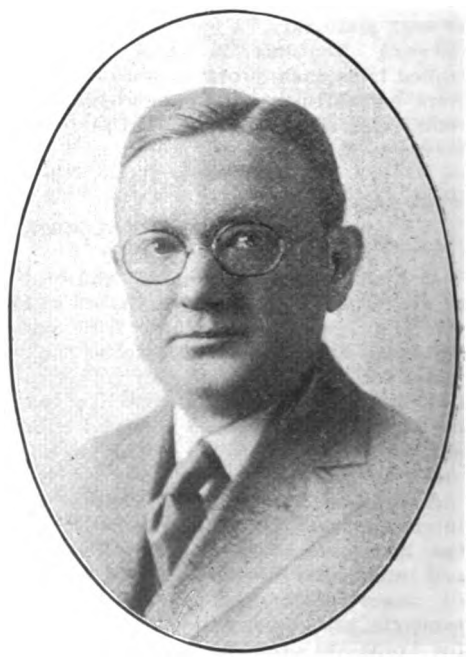
Roy B. Simming has resigned from the Gasene company. He was formerly assistant secretary of the Minneapolis Automobile Trade Association.

J. H. Harrison has been appointed sales promotion manager of the Parrett Tractor Co., Chicago, Ill. He was formerly advertising manager of the Chalmers company, also associated with the National Cash Register Co., and the Burroughs Adding Machine Co. Mr. Harrison will have charge of the advertising and sales promotion.

Leslie F. Smith has resigned as general manager of the Willys-Overland branch at Newark, N. J. During his managership he was connected with the Automotive Trade Association. He is succeeded by C. B. Derby, who has been assistant sales manager of the Willys-Overland New York branch for several years.

William H. Eged has been appointed sales director for the Fulton Truck Co. of Philadelphia, Pa. He was formerly general sales manager for the Mitchell Motor Co.

W. Earl Clayton has been appointed general manager of the Derf Manufacturing Co., New York City. He has been connected with the company since the first of the year and since that time has increased its sales over 1000 per cent. The output of the company has reached a production of a thousand Derf spark plugs a day and plans are being made for greatly increasing the output during the next few months. The company has been reorganized and Fred Gerken continues as president.



W. Earl Clayton, General Manager Derf Manufacturing Co., New York City.

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W. S. Carleton, who was formerly connected with the sales department of the Republic Rubber Co., has joined the Emergency Fleet Corporation of Boston. For nine years he has been with the Republic Co. and has been succeeded by Corliss Wadleigh.

William J. Butler has been appointed assistant treasurer of the Bigelow-Willey Motor Car Co., Philadelphia, Pa., distributors of Paige cars. For three years he was connected with the Willys-Overland Co., and afterward with the Overland-Happer Co. as secretary and office manager.

J. F. Plunkett is now associated with the Iowa Motor Co. at Omaha, Neb. He is to be director of sales under H. H. Cannon, western manager.

F. A. Mentges has taken a prominent place in the sales department of the United Motor Service, Inc., of Detroit, Mich. He has been assistant director of service for the Remy Co., Anderson, Ind.

William F. Edwards, who has been sales manager of the Goodrich-Lenhart Manufacturing Co., Philadelphia, Pa., will distribute the products of the company throughout the West. His headquarters will be in Chicago.

M. D. Millner has joined the purchase department organization of the Dart Truck and Tractor Corporation. He will assist in securing materials. Frank Wermes has taken charge as superintendent and production manager and F. W. Kleist, John R. Williams and Dwight L. Mink have been added to the sales department.

Robert A. Stranahan has enlisted in the naval air service. He was formerly president of the Champion Spark Plug Co. of Toledo, O.

George B. Cullen is now assistant manager of sales for Knickerbocker Motors, Inc., New York City. He was formerly associated with Sandow Motor Truck Co., Chicago.

E. H. Delling succeeds C. E. Broad as chief engineer of the Stanley Motor Carriage Co., Newton, Mass.



Eddie Rickenbacher, Famous Racing Pilot, is an American Ace.

Homer Beckenbach has entered the service as inspector in the drop forging department of the ordnance department in Detroit. He was formerly assistant sales manager of the Cleveland branch of Willys-Overland Co.

H. S. Benjamin is now sales manager of the Holly Carburetor Co. of Detroit, Mich. Previous to that he had been general sales manager of the Saxon Motor Car Corporation.

A. B. Walker has resigned as representative of the Budd Wheel Corporation, Philadelphia, to join the staff of the bureau of aircraft production. He has left for an eastern station.

Orrel A. Parker, formerly manager of the wheel department of the Hydraulic Pressed Steel Co., has gone to Washington to engage in government work. He is in charge of records under W. F. Parris, chief of the oil and lubrication branch, supply section, in the office of the director of military aeronautics.



R. H. Spear, President of the All-American Truck Co.

F. W. McWilliams, associated with the Firestone Tire and Rubber Co., Akron, O., for a number of years, has been appointed eastern cycle tire and accessory sales manager of the company.

E. M. Beach has been appointed to the position of inspection of the bureau of aircraft production. He was formerly president of the Manufacturers Foundry Co., Waterbury, Conn., and also a member of the board of directors and executive committee of the Motor and Accessory Manufacturers Association.

H. M. Prewitt is now district manager in charge of the service station sales of the Detroit branch of the Willard Storage Battery Co. S. S. Jenkins, formerly district manager at Detroit, has been appointed in charge of manufacturers' sales, with headquarters at Detroit.

H. O. Penland has been appointed manager of the Cleveland office of the U. S. Ball Bearing Manufacturing Co. He was formerly sales manager of the company.



B. H. Boensch, Manager New York Branch of Bearings Service Co.

H. D. W. Mackaye has entered the government service in connection with munitions production and is located at Jackson, Mich. Mr. Mackaye has been connected with B. F. Everitt in the receivership settlement of the affairs of the Ross Automobile Co.

O. F. Conklin has been appointed general manager of the Remy Electric Co. He was formerly chief engineer of the company. G. V. McMahan, sales manager of the motor equipment division, has been appointed assistant general manager.

George L. East has become associated with the Gulf Oldsmobile Co., New Orleans, La. He has resigned as assistant sales manager to the Olds Motor Works, Lansing, Mich. He will distribute the Oldsmobile throughout Louisiana. Mr. East started with the Olds company in 1907, which includes five years as advertising manager, several years as wholesale representative and 1½ years as assistant sales manager.

Dr. E. A. Wullenweber, connected for many years with the Morgan & Wright factory in Detroit, has joined the Mid-Continent Tire Manufacturing Co. of Wichita, Kan.

H. A. Waterbury has been appointed advertising director of the Essenkay Co. and A. H. Lippman, formerly in charge of the advertising, has resigned to join the colors.

E. S. Lee, Jr., has entered the army as first lieutenant in the Motor Transport Service Division. He is stationed at Camp Holabird, Md. He was formerly sales manager of U. S. Motor Truck Co.

D. V. Foster, who was formerly assistant general sales agent of the Midvale Steel Co., and later connected with the Washington office of the Midvale Steel and Ordnance Co. and Cambria Steel Co., has joined the sales organization of the Hess Steel Corporation of Baltimore, Md., will represent New York and New England territory.

L. H. Morril, for the last two years in charge of the engineering department of the Northway Motors Co., has been appointed assistant engineer of the Buda Co., Harvey, Ill.

Howard C. Caldwell has resigned as assistant advertising manager of the Haynes Automobile Co., Kokomo, Ind. He has entered the Great Lakes Naval Training Station.

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Overhauling The Chalmers 6-40 Engine

(Continued from Page 19.)

up and two down. The vertical shaft should have about .004 inch end play.

Now connect up the oil lines to main bearings, making sure that they are clear of foreign material and that the oil holes in the center bearing caps line up properly. Next put the steel cylinder around the gear and connect up pump and oil line; also tighten the packing nut in the case. Look over all of the connecting rod and main bearing nuts to make sure that all cotter pins are in place. See that oil overflow lines from front and rear bearings empty into the splash pan and after this is done the lower part of the engine is finished.

Going now to the cylinder head, first mark all the valves so as to know where they belong. Remove the tin cap on the top of the valve and the felt and leather washer. Notch the end of a board and press down on the valve spring and pull out the key. Grind the valves until there is a nice polished streak clear around both the valve and seat. Before reassembling the valves drill four ⅛ inch holes around the bottom of the lower spring retainer and a small one near the top of it. This allows any oil that may get inside to run out again instead of working down the valve stem and thus into the cylinder.

Lay the rocker arms in their places, or at least one of them and see where the corners and belly will be apt to strike the valve cap. Then grind some of the arms in those places. Adjust the cam bearings before putting the rocker arms in place, getting them snug enough so that the shaft can be turned by hand with one bearing tight. When all bearings have been adjusted in this manner remove the camshaft again, replace the caps and nuts so as not to lose any shims. Replace the lower part of engine in the chassis, put on a new copper gasket and set the head on the engine, screwing all nuts down as tight as possible.

Put all rocker arms in place and tighten down all brackets except the timer gear bracket. Lay the camshaft in and tighten down bearings. When laying shaft in have it in position so that No. 6 inlet cam, which is the last cam, is pointing straight up. Then adjust the rocker arm under this cam so that it will just move freely. Take the vertical shaft sleeve and slip the gear on it. We are now at the point where most mechanics fall down on the job.

Timing the Valves and Ignition.

After arriving at this point it should not take over five minutes to completely time the engine. Put plain washer on the gear and screw the nut down tight. Turn the crank until No. 6 inlet valve is just about to open. To tell when the cam has reached this point have some one keep moving the arm sideways while you turn the shaft and when he can no longer move it you will know that the valve is ready to open. Now we know that when No. 6 inlet valve starts to open No. 6 piston must be at top dead center, so now loosen the vertical gear nut and if the gear is fitted freely on the sleeve you can turn the crankshaft around until the mark "D-C 1-6 In. O," is directly under or not over a half inch past the pointer, and the camshaft will not move. Then put the lock washer under the nut, tighten the nut down and test it again to see if valve opens in the proper place. Then remove nut and washers and put set screws in and tighten nut. With No. 6 inlet valve about to open and flywheel mark just past the pointer, stand on the left side of the engine and take a long screw driver and pry up the timer gear until it will turn around by hand. It will then be noticed that the slot in the timer gear shaft is cut off center, so turn the gear around until the wide part is towards your side of the engine and the slot is about parallel with the camshaft. Now let the gear down in mesh and tap the whole bracket down in place and the gear will turn so that slot is pointing at a spot about half way between the rear cam bearing and the comer stud. Set the timer on, turn the brush around until it sets down in the slot and turn the housing to the left until the arm points to the left of a point straight in front of the timer. Then turn it to the right until you hear a click, which should occur when the arm is pointing at right angles to the engine. If it does not click in proper place lift up the gear and move it around one tooth at a time until it does click properly. The engine is now timed so adjust the rest of the tappets, put on cover and the overhaul is complete. The engine fires 1-4-2-6-3-5.

EARNINGS OF PIERCE-ARROW MOTOR CAR CO. INCREASED.

The net operating profits of the Pierce-Arrow Motor Car Co., Buffalo, N. Y., for the three months ending June 30 were $1,523,421, or $220,045 over the earnings for the corresponding period of 1917.

NEW SPEED REGULATIONS IN CAMBRIDGE, MASS.

The Massachusetts Highway Commission has approved the special regulations made by the Board of Park Commissioners of the City of Cambridge, Mass., and has issued a notice that no person shall operate an automobile or motorcycle at a rate of speed in excess of 25 miles per hour on the Charles river road in the City of Cambridge, between Cambridge bridge and Mt. Auburn street; and that no person shall operate an automobile or motorcycle on any curve on said road at a rate of speed in excess of eight miles per hour.

FIND SHORT MEASURE GASOLINE PUMPS IN N. H.

A crusade has been started in New Hampshire to discover the cause of the many complaints on the part of motorists that they are victimized by gasoline dispensers, and the commissioner of weights and measures of the state has called in the services of all the men in his department to inspect the 4000 gasoline pumps throughout the state.

HAL C. SMITH KILLED IN ACCIDENT.

Hal C. Smith, treasurer of the Carl M. Green Co., Detroit, Mich., received injuries in an automobile accident from which he died on Aug. 1. He was 34 years old and well known throughout the automobile industry. At one time he was advertising manager of the General Motor Truck Co.

CONAPHORE LENSES FOR PIERCE-ARROW CARS.

The Edward A. Cassidy Co. of New York City has announced that the Pierce-Arrow Motor Car Co., Buffalo, N. Y., will use Conaphore headlight lens, made by the Corning Glass Works, Corning, N. Y., as standard equipment on its passenger cars. The Cassidy company is exclusive wholesale distributor of Corning lenses.

Moco Monkey Grip Tire Patch has made one of the most phenomenal sales records since its introduction on the market of any similar article ever offered to the motoring public. It is manufactured by the Moco Laboratories, Oklahoma City, Okla., and Mt. Vernon, Ill., which company has enjoyed an increase in business in less than three years from gross sales of $50,000 to nearly $1,500,000. According to the manufacturers it has been recognized by the government as a standard tube repair method and is being used for repairing punctures, blow outs and holes in tubes in practically all the cantonments. It was adopted after tests had been made of 67 cold patches and tube repair methods.

Farley & MacNeill, 105-107 Federal St., Boston, Mass, have been appointed exclusive agents for the Moco Monkey Grip Patches in the northeastern states, being sole distributors for New York, New Jersey and New England.



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DORT OWNERS USE CARS PRINCIPALLY FOR BUSINESS.

A recent canvas of Dort owners in the city of Detroit showed that 82 per cent. are using their cars wholly or principally in business and consider them indispensable.

"This represents about 850 Dort owners," says one of the Dort officials, "and it opens the mind to an interesting line of thought. We have no data as to just how much time these owners are saving by using an automobile in preference to other means of conveyance, but let's be ultra conservative and place it at half an hour daily. So then we have a time saving of 425 hours a day on the part of Dort owners in one city alone.

"On that basis these owners in the city of Detroit—which should be typical of this and other cities—save in a year of 300 working days, 127,500 hours.

"This, mind you, represents a saving by the owners of only one make of passenger automobile in one city. When you consider that there are about 5,000,000 cars contributing to the transportation facilities of this country, an appreciation of the indispensable utility of passenger motor cars cannot be avoided."

CONTINENTAL GUARANTY CORPORATION DIVIDEND.

The board of directors of the Continetal Guaranty Corporation on July 22, 1918, declared a dividend of two per cent. for the quarter ended June 29, 1918, on the capital stock of the corporation, payable July 25, 1918, to stockholders of record at the close of business July 23, 1918.

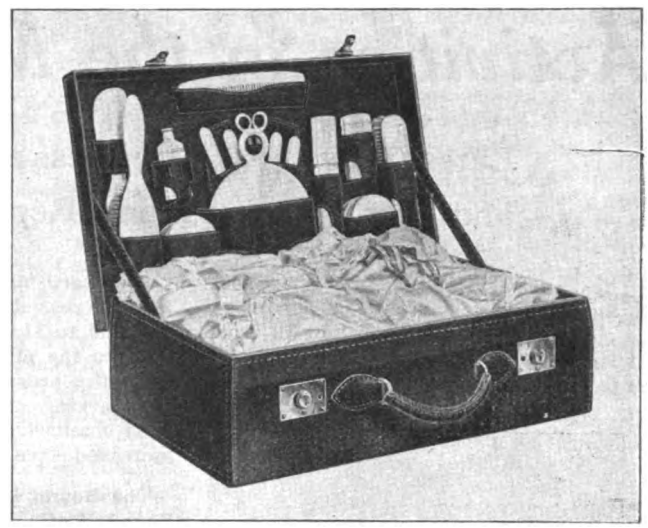
The Ajax Touring Refrigerator is made in trunk form and contains three compartments, two for eatables or bottled goods and the third for ice with a threaded compartment to prevent water leakage. It attaches to the running board and is air tight and dust proof.

Manufactured by the Ajax Trunk and Sample Case Co., 144-150 West 18th St., New York, N. Y. Price, $20.



Ajax Touring Refrigerator.

The Overnight Bag is designed particularly for the business woman for use on trips entailing an overnight stay and for week-end visits. It is large enough to hold a night gown, shirt waist and a few other small articles. Fifteen toilet necessities made of ivory pyralin are fitted inside the cover. The case is made of high grade fabrikoid, a pyroxlin coated leather substitute of great durability. This material is quite as beautiful as leather. Is water, dirt, grease and stain proof and can be kept immaculate with soap and water. The case is lined with either fabrikoid or cloth of a harmonizing color.

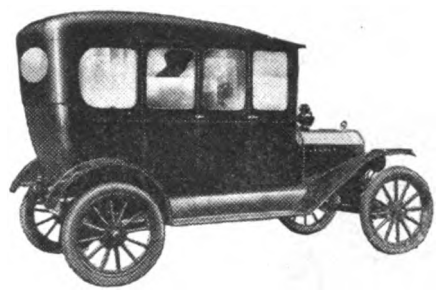


Overnight Bay with Pyralin Toilet Set.

Manufactured by the Du Pont Fabrikoid Co., Wilmington, Del. Write for prices and literature.

The Anchor Top and Body is built in a complete line of demountable winter tops for Overland, Oakland, Buick, Ford, Dodge and Oldsmobile cars.

These tops are strongly constructed throughout, being built of selected hard wood stock, reinforced with steel. This frame is then covered with a high grade



Anchor Top and Body.

luster lasting water proof material and the interior is attractively lined in a soft gray cloth. All windows are of extra heavy crystal glass. Doors are so arranged that they open and close with the regular body doors of the car (except Fords). Windows of doors are provided with drop glass panes, which may be raised or lowered as desired, thus insuring ample ventilation at all times. Anchor tops fit snugly to the regular body of the car, with no overhang or unsightly attachments of any kind. All tops are shipped in such a manner that it is a very easy matter to install them on cars satisfactorily. All necessary attachments are furnished and as tops fit to regular body irons of car and are held there firmly by means of special irons, no difficulty should be experienced in getting tops on properly. Complete instructions are furnished and each iron is plainly marked where it is intended to be used. A large stock of all models are carried at factory for immediate shipments. However, in order to avoid delay in transportation dealers are advised to place orders early.

Manufactured by the Anchor Top and Body Co., Cincinnati, O. Write for prices and literature.

JORDAN SPORT MARINE WILL BE CONTINUED.

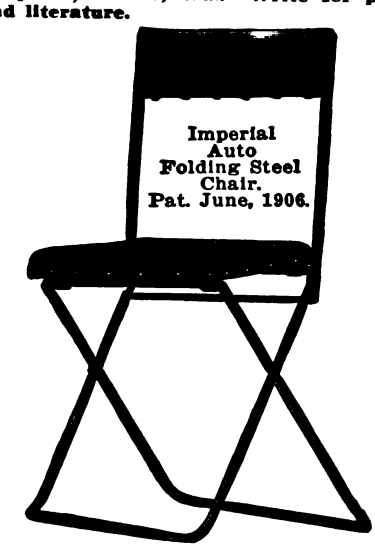
The adaptability of the four-passenger car to personal driving, in view of the shortage of chauffeurs, has brought out the announcement from the Jordan Motor Car Co. that the Sport Marine will be continued as a regular Jordan model for the coming year.

In connection with this announcement, Edward S. Jordan, president of the company, reviews the history of automobile selling, recalling the time when salesmen sold cars on their mechanical features, the full-floating axle against the semi-floating, the four-cylinder motor against the two, the six against the four, and so on.

Today, he points out, the car that suits the public taste is the car built of standard parts, approved and accepted by long use, with a body of stylish lines, suitable for the particular style of driving in vogue and fully equipped. Such a car is the Jordan Sport Marine, which was designed for the man who drives his own car and who wants all the things that make driving comfortable and safe.

The Imperial Auto Folding Chair was primarily designed for a convenient auxiliary folding seat in an automobile. It folds compactly in a small space when not in use and is an ideal chair for the camp, beach, launch or car. The seat and back rest are padded with felt and upholstered in black water proof art leather. The frame is made of special oval formed steel finished in black enamel. It is made in several sizes to meet various needs.

Manufactured by the Imperial Bit and Snap Co., Racine, Wis. Write for prices and literature.



Imperial Auto Folding Chair.

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Activities in the Motor Vehicle Industry

Latest News of the Business and Building Plans of the Leading Car and Parts Makers and Reports of Developments in the Trade.

The Imperial Brass Manufacturing Co., Chicago, Ill., has just opened a new welding shop and are open for orders from manufacturers who have government contracts to make tanks, cans, containers, ovens, etc., which require the joining of metal to metal. This welding shop is one of the most thoroughly equipped in the country and maintains a staff of expert welders, who are in a position to help manufacturers to make prompt deliveries, keep up production and reduce manufacturing costs. The oxy-acetylene welding process, used in this shop, is far superior to riveting in making metal joints. Broken automobile parts and machinery of all kinds are also quickly repaired at the welding shop, which is perhaps the largest in the middle west. This department occupies a new building 50x150 feet, erected especially with a view to speeding up government contract work, and is ready to give exceptional service. Those interested in securing such service should write to Imperial Brass Manufacturing Co., 1200 W. Harrison street, Chicago.



New Welding Shop of Imperial Brass Manufacturing Co.

The Ever-Wear Rubber Co. of Milwaukee, which was recently organized with a capital stock of $200,000, will manufacture a new inner tube. The inner tire is the pneumatic type and is protected by a cellular cushion hoop separating the tube from the casing. The officers of the company are: President, Andrew Steel; vice president, William A. Schacht.

The Gary Motor Truck Co., Gary, Ind., has increased its capital stock from $175,000 to $1,000,000. Additions will be built to the plant to increase production from the present rate of 500 a year to 1500 a year. The management has not been changed. The production has been increased several times.

The Bound Brook Oilless Bearing Co., Bound Brook, N. J., has insured all employees who have been in the service of the company for three months. They are insured for $500. The expense of the policies is paid by the company and the insurance plan applies to employees at the Bound Brook plant and the two factories at Lincoln, N. J.

The C. A. Dawton Co., De Pere, Wis., is completing work on a two-story addition, 40x120 feet. This addition will be used for the forge shop, pattern making department and machine shop. A new boiler room 36x40 feet is also being erected. They are manufacturers of gasoline engines.

The Hardman Tire and Rubber Corporation, Belleville, N. J., was reorganized in July and business will be continued under the name of the Hardman Rubber Corporation. An addition to the new plant will be erected. The present production is 125 tires a day. When the addition is completed the production will be increased to 450 tires.

The Paige-Detroit Motor Car Co., Detroit, Mich., has increased the prices of its cars which are as follows: Model 6-39 has been increased $120 and will sell at $1515; model Essex, 6-55, has increased $155 and will sell at $1985; Larchmont, 6-55, has increased $140 and will sell for $2090.

The Falls Motors Corporation, Sheboygan Falls, Wis., is erecting a machine shop addition. This will be a two-story building 60x125 feet and will be used for completion of government contracts for truck, airplane and tractor engines and parts.

The Highway Trailer Co., Edgerton, Wis., is erecting a new shop 50 by 250 feet. James W. Manhall is general manager. The company is working on government contracts for trailers for hauling airplanes, ordnance and quartermaster supplies.

The Twin Fire Spark Plug Co., Detroit, Mich., has moved to a larger factory at 720 Grand River avenue. The company has also enlarged the dealers organization considerably.

The Timken Roller Bearing Co., Canton, O., has increased its capital stock from $200,000 to $10,000,000.

The Western Reserve Rubber Co., Akron, O., has increased its capital stock from $10,000 to $50,000.

The Knight Tire and Rubber Co., Canton, O., has increased its output from 200 to 760 tires a day.

The John Obenberger Forge Co., Milwaukee, Wis., is erecting a forge shop addition for the manufacture of crankshaft, camshaft and similar forgings for the government. The present plant has undergone constant enlargement during the past nine months.

The Limousine Top Co., Kalamazoo, Mich., has secured a contract for the erection of a new building to its present plant. Work on the structure has already begun.

The C. R. Wilson Body Co., Detroit, Mich., is erecting a three-story addition to its factory at Clay avenue and Grand Trunk railroad.

The Motors Metal Manufacturing Co., Detroit, Mich., in order to take care of a government order for metal parts to be used for ambulances, is erecting two large additions to its plant. One building is 60 by 200 feet and the other is 50 by 60 feet.

The Chevrolet Motor Co., Flint, Mich., has advanced the price on its models and are as follows: The Baby Grand model, $100, from $995 to $1095, and model 490, $50, from $685 to $735.



Champion Spark Plug Salesmen and Their Wives at Midsummer Convention in Toledo.

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The Bailey-Drake Co., Chicago, Ill., has moved its main offices to 1118 South Michigan avenue. The company has branches in Minneapolis, Kansas City, Seattle and San Francisco. The company represents manufacturers selling the jobbing and manufacturing trade.

The North-Light Motor Co., Toronto, Ont., with offices in the Wesley building, has taken over the two-story factory at Hamburg, formerly occupied by the Silversmith Manufacturing Co. A four-cycle high speed gasoline engine for boats, automobiles, trucks and tractors, as well as stationary engines, will be manufactured.

The General Aluminum and Brass Manufacturing Co., Detroit, Mich., will enlarge the factory by adding an extensive scale of factory buildings. The buildings engage in assembling one-ton war trucks. Later it is planned to manufacture engines, axles and other parts patented by the company.

The B. F. Goodrich Rubber Co., Akron, O., announced that the best half year in its history ended June 30. Earnings amounting to $7,150,000, were practically $2,000,000 ahead of either six months period last year.

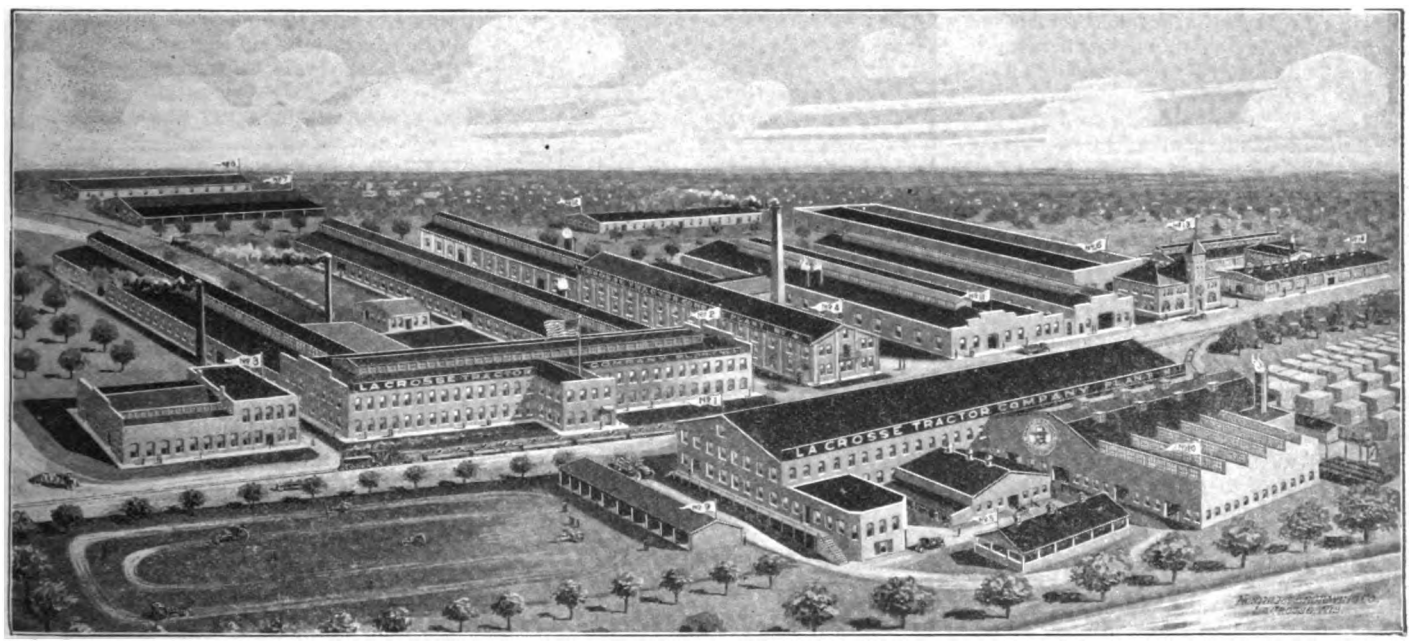
The Joseph Dixon Crucible Co. has issued a booklet called "Evidence." This was made necessary on account of the company receiving so many letters from the trade telling of the increase in sales. The sales of Dixon's graphite automobile lubricants have been increased 100 per cent.

The Motor Appliance Co., East Moline, Ill., has taken over the plant of the Ogden Manufacturing Co., Plymouth, Ind. The new company is formed to manufacture automotive appliances, consisting of three specialties: The Marco speed recorder, the Benson automatic speed signal and Ogden parts. The Marco speed recorder is a mechanical device for recording instantly the exact rate of speed attained per hour, the total number of miles traveled and the number of stops made.

The Owen Magnetic Motor Sales Corporation, which handles the Owen Magnetic Car in the New York territory, will hereafter handle the Liberty. The Colonial Motors, Inc., of which John F. Plummer was president, handles the Liberty. Mr. Plummer has entered government service and the company has been dissolved.

The All-American Co., Chicago, Ill., is a new concern which will manufacture trucks. The company occupies the three-story factory building at Sacramento boulevard and Chicago and Grand avenues, formerly the plant of the Ogren Motor Works. The concern is turning out a standard one-ton truck with a 43 horsepower motor, which is designed to burn either gasoline or kerosene. The machine will use the Hotchkiss drive. The chassis will list at $995. The president is R. H. Spear; Robert J. Sutton, vice president, in charge of manufacturing. The treasurer of the company is G. W. Barden, for a number of years secretary and treasurer of the Kelly-Springfield Motor Co., as well as being connected with a number of financial houses.

The J. H. Koehler Motors Corporation, Newark, N. J., has appointed the following agencies as distributors of Koehler trucks: John E. Watson, Woodstown, N. J.; Sauner Hardware Co., Shamokin, Pa.; J. Calvin Boyer & Sons, Mt. Pleasant Mills, Pa.; High & Trout, Pottstown, Pa.



The Plant of the La Crosse Tractor Co., La Crosse, Wis.: 1, Machine Shop; 2, Tractor Assembly and Paint Shops; 3, Pattern Shop; 4, Machine Shop and Iron Foundry; 5, Engine Testing Shop; 6, Sheet Metal Shop; 7, Storage; 8, Storage; 9, Final Testing Shed; 10, Iron Foundry; 11, Steel Foundry; 12, Experimental Shop; 13, General Offices; 14, Iron Foundry.

are being added to the company's group and are to be used in completing war work for the government. The new units are as follows: Aluminum factory, two stores, 100 by 100; brass furnace building, 40 by 100, to be equipped with sand bins in the basement and with simplex and coke furnaces.

The Scripps-Booth Corporation, Detroit, Mich., has advanced the prices of its cars and are as follows: Model 6 touring, formerly selling for $1195, now $1385; model 4, touring, formerly listed at $985, now $1065. The price of the eight-cylinder model remains the same. The new six-cylinder coupe and sedan models, known as models 42 and 41, will be sold for $1985. The company will bring out a new model K semi-coupe with a winter top. The price has not been set. During the month of July the company manufactured 750 cars.

The Auto Manufacturing and Engineering Co., makers of automobile trucks, is planning to move from Detroit to Ft. Wayne, Ind. The capitalization of the company is $500,000. The company will

The Motors Metal Manufacturing Co., Detroit, Mich., manufacturers of sheet metal parts for trucks, tractors and automobiles, such as hoods, fenders, gas tanks and pans, moisto-rizers and stampings, has found it necessary to erect an addition to their main plant, 65x260 feet, which building is already under way. This company at the present time is devoting approximately 70 per cent. of their output to government work on trucks for the signal corps, four wheel drive and three-quarter-ton ambulances. In addition to above they manufacture a line of Ford fenders and stream line hoods, which are distributed throughout the country by the large jobbers of accessories.

The Michigan Steel Castings Co., Detroit, Mich., is erecting an addition to its plant, which will add 53,700 square feet. Additional men will be employed. The building will be used for molding, core making and the engineering department. This building will be completed in the fall.

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GOING HOME WITH BROKEN SPRING.
(Figure 512.)

Spring breakage is not a common occurrence, but it sometimes does happen in the most unexpected places and it is advisable to know how to make a temporary repair to enable one to drive the car home or to the nearest garage where a new plate or spring can be fitted. A piece of well seasoned oak or ash, just over half the length of the spring and from ⅝ to one inch in thickness, with some strong cord or soft wire. The breakage will probably be through the center of the springs on account of the holes in the leaves, for the center bolt weakens them at this point. The splint should be laid upon the topmost leaf as shown in the sketch, whereupon the frame of the car is jacked up so as to bring the spring and the axle to their relative position before the break. Splint and spring should then be firmly lashed together and to strengthen the job a block of wood may be wedged between the spring and the frame and the car will then be in a position to be driven slowly home. If the wooden block is not available a half brick may be used for this purpose and a jack handle in place of the splint should this be left at home.

A MECHANICAL TIRE PUMP.
(Figure 514.)

How many times have you started on a pleasure trip or tour and was forced to blow up three or four tires in the hot sun, spoiling all pleasure and the rest that you anticipated.

We suggest a contrivance which will eliminate all hand pumping and inflate the tires easily and quickly.

Attach a heavy iron hook underneath each running board near the outside edge of the automobile. Bore a hole in the foot step of the tire pump large enough to take the hook. It will probably be found necessary to bend the plunger into an eye so that the bolt may be slipped through it. Obtain a length of strap iron long enough to reach from the eye of the pump to the hub wrench, which is placed over the hub of the rear wheel, as shown in the sketch. If the pump is provided with a rubber tube long enough it will be possible to inflate either of the three tires. The other tire may be inflated by placing the pump on the other rear wheel. As there are three ranges of speed it does not matter which way the wheel turns. Jack up the rear wheel, start the engine, throw in the clutch and let the engine do the rest. This method has been found practical.

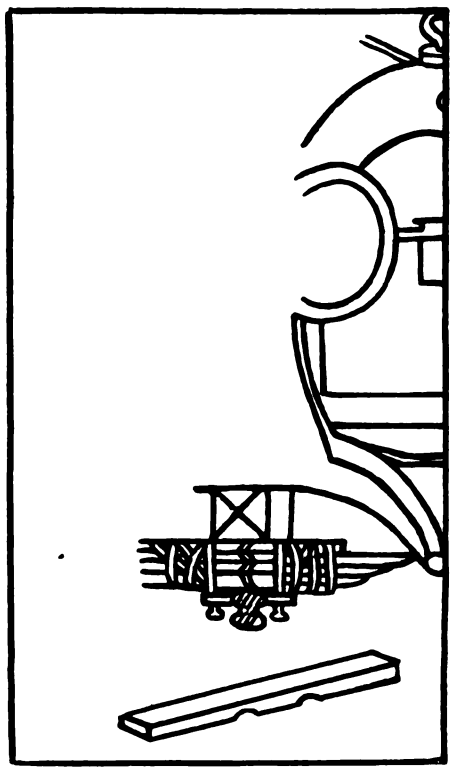


Figure 512.

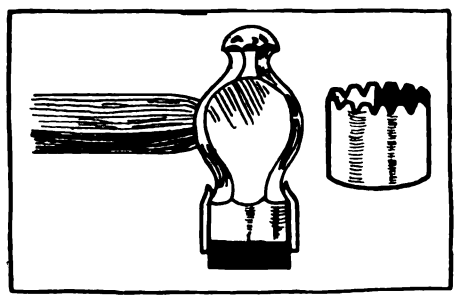


Figure 513.

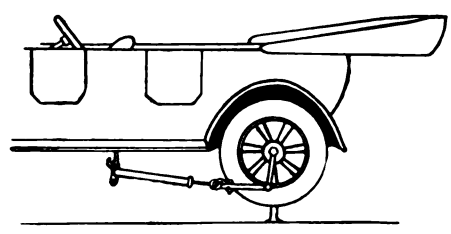


Figure 514.

MAKING A SOFT HAMMER.
(Figure 513.)

In making an attachable soft head for a hammer a piece of ordinary metal tubing about 2½ inches long is necessary so that it will slip easily over the head of an ordinary hammer. The tube is cut by means of a hacksaw into the shape of a V so that the V pieces may be bent over so as to clamp the device to the hammer. Into the tube projecting beyond the hammer should be poured molten lead, which when set will provide a very effective soft hammer. The lead must be left projecting of course and may be trimmed into shape, leaving about a quarter of an inch projecting beyond the head.

LEAKING PLUGS.

A great many automobiles are still in use with non-detachable cylinder heads and this type use valve plugs. These plugs often develop leaks which may be stopped by the application of ordinary stove paste or blacking over the threads. Too much should not be used. It may be applied at any hot joint in place of white or red lead.

HAVE YOU A BETTER PLAN?

When you read the suggestions on these pages do you compare it with the plan you already follow for a similar class of work? Could you improve on the suggestions expressed here? Would you criticise the ideas of the author? Does one of the articles bring to mind a scheme you have worked out for solving an entirely different problem. Then why, Reader, don't you write us about it? Why not give the other readers the benefit of your ideas along these lines? To grow is to keep step with the times, to make known your ideas—to pass along your own experiences, plans, shop kinks, etc. Write up a little item about your ideas and send them to the Mechanical Editor.

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MISCELLANEOUS PRACTICAL SUGGESTIONS.

If one is out on the road and it is necessary to obtain gasoline for priming the engine when all other methods of obtaining it from the tank fail, a valve cap tied to a piece of string and lowered into the tank will suffice to draw up enough gasoline to prime one cylinder. This can be done as often as necessary and is a good thing to have in mind in an emergency.

When one is out in the country on a dark road at night and the battery is insufficient to enable one to see his way clearly, a half hour's running of the engine with the car standing will store up enough current to get back home.

When you feel the rear of the car skidding sideways don't apply the brakes. Throw out the clutch and steer into the skid. Point the front wheels the way the car is skidding and let the driving wheels turn as slowly as possible. It is sometimes advisable to apply more power and the car will naturally straighten itself out before serious damage results.

The experienced driver will always carry in the tool box a tobacco sack full of different sized nuts and another sack full of assorted washers and cotter pins. Accidents usually occur when far from home and these little items are invaluable in such an incident.

It is very common for a driver to squeeze his car against the curbing and if in a tight place is likely to injure the tires in trying to get away. A jack placed under the front axle and the car pushed away from the curb after it is raised will usually suffice to allow him to turn the wheels sufficiently to clear his car.

To prevent rust on tools use vaseline to which a small amount of powdered gum camphor has been added. These may be melted together over a slow fire and applied to the tool with a soft rag.

CLEAN THE TOOL BOX.

More than once it has been said that the average man has a strong objection to destroy anything that belongs to him, and that if the numerous things that he so carefully carries about in his clothing were to be gone over and analyzed he would find that most of them are not of the slightest use. This tendency to hoard up useless things not only extends to his person, but even to the motor car.

An inspection of the tool box in one's spare time will bring to light a useless collection of broken parts of spark plugs, nuts and bolts that have lost their thread, etc., and the motorist proudly considers that in carrying this assortment of useless junk that he is well provided for in an emergency. When anything is wanted quickly it is always difficult to find. It would, therefore, be considered time well spent to devote a few minutes spare time in cleaning the tool box. If a system is applied to the tool box much time and unnecessary trouble will be saved. All the miscellaneous nuts, bolts and washers should be put in small boxes and packed snugly into the bottom of the tool box. The tools which one needs the most should be left near the top of the box and the other accessories graded downward according to the frequency of their various uses. This method applied to the private garage would not be without its advantages.

RECLAIMING DRY BATTERIES.

Many dry batteries are thrown away simply because one does not know that they can be reclaimed. This can be done at practically no expense and little time. Punch a number of holes around the zinc cover of the battery after removing the cardboard cover. Mix a saturated solution of sal ammoniac and water and keep adding the crystals until the water will dissolve no more after letting the solution stand for half an hour. This solution can then be strained and immerge the battery, taking care that the solution does not come over the top. Let the batteries soak for an hour or more until the cells have absorbed the solution to their full capacity. Remove the batteries and plug up the holes with wax or paraffin and return them to their cardboard containers.

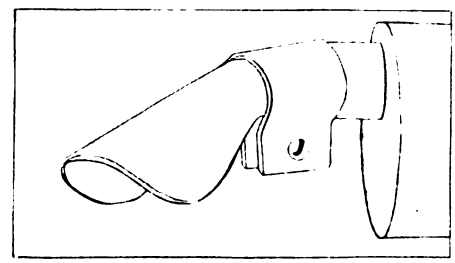


Figure 515.

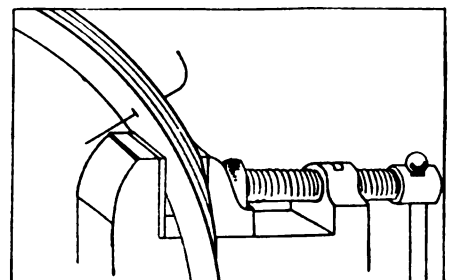


Figure 516.

DEFLECTOR FOR EXHAUST PIPE.

In some cars it so happens that the rear of the exhaust is placed in such a position that the gases as they pass from it into the open air are caught by the swirling air behind the car and sent up backwards over the rear seats.

A device to prevent this trouble is easily made by purchasing an adjustable spring clip and shaping a piece of tin into a cowl arrangement so that the gases upon striking this are sent downward and outward from behind the car.

OVERHAULING SPRINGS.
(Figure 516.)

Rattling and squeaky springs are very annoying and while their overhauling is a dirty job it does not have to be done often and amply repays the operator for the labor spent.

The car must first be raised so that the wheels clear the ground and this may best be done with the aid of horses slipped beneath the frame. As the operator is working continually under the car this method is much safer, as it gives the car perfect stability and prevents the chance of the car slipping.

The springs are held to the frame by shackle bolts and to the axle by U clips. The shackle bolts are first removed, after which the axle and springs can be lifted clear of the car. The axle is then turned bottom upward, thus making the U bolts easily accessible. Between the axle and the U clips there is usually a strip of hard wood packing, which must be replaced when the spring is being reassembled. After the U bolts are removed the spring will come free of the axle. The leaves of the spring are held together by a center bolt in most instances and the spring must be placed in a vise before this bolt is removed. The vise is then opened slowly and the leaves will separate, touching at the ends, whereupon a gap will appear about a half inch wide between the surfaces of the leaves. The contact surfaces of the leaves will probably be rusty, with a few brown polished spots where the uneven surface has rubbed for lack of lubrication. A stiff wire brush and some emery cloth will smooth away the rust, after which the spring may be thoroughly washed in soap and soda water and then dried carefully with a cloth. The spring should then be gone over with graphite, working it well into the pores of the steel. In replacing the spring leaves a thick piece of wire should be threaded through the center bolt hole of each leaf. This will cause the holes to line up when the assembly is clamped into the vise. The U bolts should not be tightened until the spring and axle is fitted to the shackle links, because the U clips allow a slight lateral movement of the spring on its table or pad on the axle. In this way one can tap the spring this side or that with a light hammer to set it more squarely upon the shackle bolts. After these have been tightened the U clips may also be taken up and the finished result will be an easy riding spring free from squeaks and rattles.

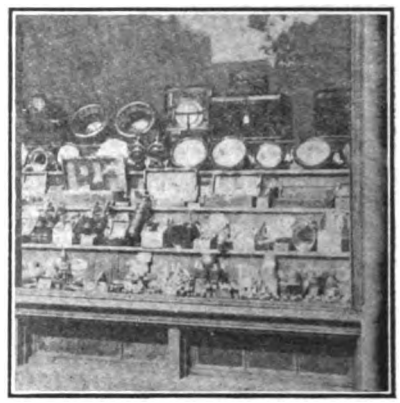
TO CLEAN THE HANDS.

For the car owner who does his own work the question of keeping his hands presentable is quite a problem. After the work about the car or garage is finished, a light oil, preferably cylinder oil, is rubbed upon the hands, using it just as soap and water are used. This method will work all the grease loose and then the hands may be wiped on a piece of clean waste or cloth, thus leaving the hands in good shape for thorough cleansing with soap and water.

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Accessories Department



The Blu-Streak Spark Plugs have many advantageous points. The base or shell is made from large size carbon steel, carefully machined and finished. The side electrode, as well as the center electrode, is made from pure nickel alloyed with about two per cent manganese. The shape in which these electrodes are bent prevent their becoming fouled, as the oil drip is always below the spark. The insulation is made from approximately 50 inches of latterally wound mica. This mica is the finest grade obtainable. Owing to the unique construction of this plug the hotter the engine gets and the higher the speed generated the tighter the plug becomes. The tapered insulating mica tube and the tapered shell are all driven together until they can go no further. These plugs are all made accurately to standard and from the best materials obtainable.

Manufactured by the Cumming-Forster Corporation, Chicago, Ill. Write for prices and literature.

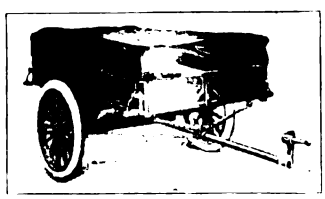
The Auto-Kamp Trailer enables one to live out of doors. It is a trailer to be drawn behind the car and when extended is a fully equipped home wherever one happens to be. It is a sleeping tent with two comfortable double beds, with real sagless springs, mattresses and bedding. It also has an ice box, two-burner gasoline stove, electric light outfit and table. The tent is water proof, wind proof and insect proof. It all folds compactly when on the road, under a dust proof, close fitting tarpaulin. It can be set up in seven minutes by one man alone. There are no bolts, nuts or clamps. The beds simply fold over on strong hinges. The tent frame is put in sockets, the bed legs are hinged and the whole is securely braced, being firm and rigid when in place. It attaches by universal socket and follows behind the car at any speed, over any kind of a road easily and silently.

Manufactured by the Auto-Kamp Equipment Co., Inc., Saginaw, Mich. Write for prices and literature.



Blu-Streak Spark Plug.

The White Valve Grinder.



The Auto-Kamp Trailer.

The Patriotic War Service Emblem is a paper sticker bearing the words "I will give a lift to a soldier or sailor going my way." It is moistened and stuck to the inside of the windshield. The makers say these are being purchased in large quantities by banks and business houses to be given away and are used on the cars of leading citizens in many of the large cities.

Printed by Herschman & Cardy, 167 Monroe St., Chicago, Ill. Write for prices and samples.

The White Valve Grinder is held in place by the operator with one hand, while with the other hand he operates the slide handle, giving the grinder a reciprocating motion and gives the valve a perfect seat free from ridges. The slide handle delivers the power over the center of the tool and there are no cranks to turn, no side gears, no bows to pull, all of which attachments for driving always serve to pull power off center of a valve the makers claim. This tool is light, strong and durable and will grind the valves of any car, and in many cases will grind valves where an ordinary valve grinder cannot be used. This tool has two small attachments on the lower end for valves that are either drilled or slotted and with its swivel attachment it is easy to get at the Ford valves under the dash.

Manufactured by the White Manufacturing Co., South Bend, Ind. Price, $2.50.

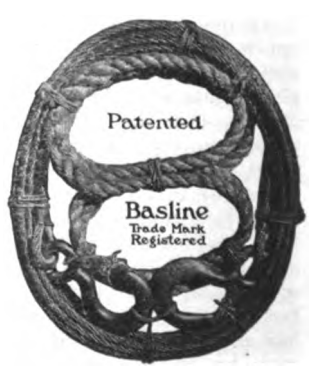
The "Basline" "Autowline" is a quarter inch yellow strand power steel wire rope with patented snaffle hooks on each end especially constructed for towing disabled cars. It is manufactured of the highest grade steel, quarter inch rope, about 20 feet long, over all. This "over all" length includes two half-inch manila rope slings, which are joined to each end. It weighs 4½ pounds, coils up flat and can be tucked away under a seat cushion. This line can pull a 4000-pound car up a 20 per cent. grade.

Manufactured by the Broderick & Bascom Rope Co., St. Louis, Mo. Write for prices and literature.



Patriotic War Service Emblem.





"Basline" "Autowline."

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The Economy Auto Case with 10 pounds of ice during the hottest summer weather will supply ample refrigeration for from 18 to 24 hours. Without the ice it may be used to keep foods warm. It is made of hard fiber board that is air tight and dust proof. Carried upon the running board it adds to the pleasure of touring by eating in the open, preparing the meals as wanted and keeping them fresh, clean and wholesome.

Prices and literature furnished on application to Traverse City Refrigerator Co., Traverse City, Mich.



The Wood Motor Shovel.

The Wood Motor Shovel is made in a convenient size to be carried in the tool box of the automobile. Its dimensions overall are 6¾ by 27 inches, while the digging space of the shovel is three inches by 8½ inches. The necessity of this shovel when outfitting for a tour is easily realized and it is a valuable and essential accessory.

Manufactured by the Wood Shovel and Tool Co., Piqua, O. Write for prices and literature.

The Gordon Motor Crib is easily strapped to the back of the front seat and is held in an open position by a spring connection to the floor or back seat with an adjustable strap. When thus suspended it is free from vibration and does not interfere with entrance into the tonneau. An adjustable hood protects baby from the sun or wind and the crib is easily folded against the back of the seat when not in use.

Manufactured by the Gordon Motor Crib Co., 27 South Water street, Chicago, Ill. Price, $10.

The Stewart Hub Odometer, model 118-A, with Ford hub cap, will fit any Ford axle. The Stewart hub cap is much stronger than the regular Ford model. It is very easy to install. Remove regular hub cap, put on odometer and fit the new hub cap over it.

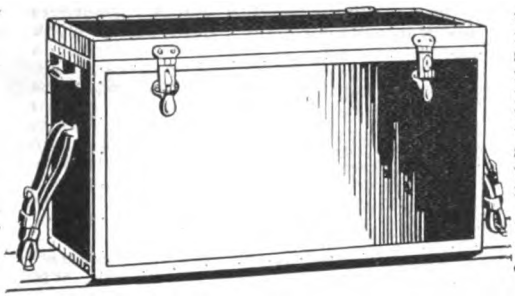
The odometer is enclosed and hermetically sealed in a case or cartridge, making it oil, mud, dust and moisture proof. It registers to 100,000 miles, forward and backward movement of the truck and repeats. Mileage cannot be changed without removing hub cap. On the other hand it is not necessary to remove hub cap to oil spindle and bearings.

As an added precaution against tampering a flange is provided by which the hub cap may be wired and sealed.

Manufactured by the Stewart-Warner Speedometer Corporation, Chicago, Ill. Stewart Hub Odometer, Model 118-A, with hub cap for Ford cars, $12.

The Roedding Signal Tail Light is housed in a cylindrical shaped metal case, 10 inches by four inches. The makers claim it to be the simplest of the many signaling devices upon the market. Its operation is controlled by a toggle button mounted upon the steering column. When the button is pressed in the central position the horn is blown. When pushed to the right the letters "right" appear, two inches in height on a roller, which is inside the water proof case. When pressed to the left the letters "left" appear and other positions signal "stop" and "back," showing accurately the direction the driver intends to take.

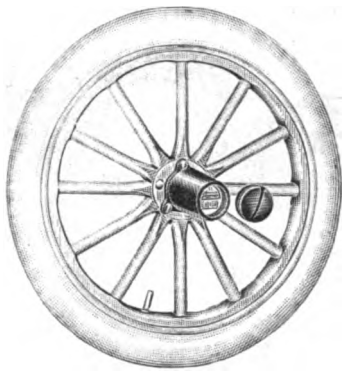
Sole distributor, K. G. Barkoot, Detroit, Mich. Price, $18.



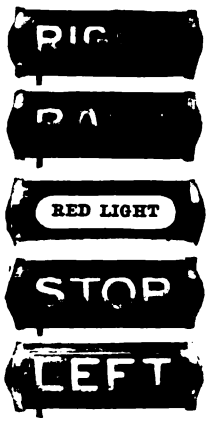
Economy Auto Case.



Gordon Motor Crib.



Stewart Hub Odometer.



The Roedding Signal Light.



Bubbling Fountains.

Bubbling Fountains may be attached to the municipal water supply in any garage and they are made in a number of styles, plain or ice cooled. The wise garage man looks to the comfort of his employees for he realizes that as long as they are satisfied they will do their best work for him. The illustration shows style number 604, which is arranged to take 75 pounds of ice in a cork insulated refrigerator.

Manufactured by the Manufacturing Equipment and Engineering Co., Framingham, Mass. Write for prices and literature.

The "Safety First" Oil Signal is very simple in construction and is light and exceptionally well finished. There is nothing to get out of order and once it is properly installed it requires no attention. The principle is simple. As soon as the oil in the crank case gets low—within about 20 miles run of the danger point—a contact is formed at a given point, causing a light to flash, which is located on the dash in plain sight of the driver. The light will then burn constantly until the oil supply is replenished, which will automatically break the contact and the light goes out and remains out until the oil again gets low. It is so simple that it may be attached in a few minutes by anyone and is sent with sufficient wiring for complete installation.

Manufactured by "Go" Motor Speeder Co., Three Rivers, Mich. Price, $4.50.



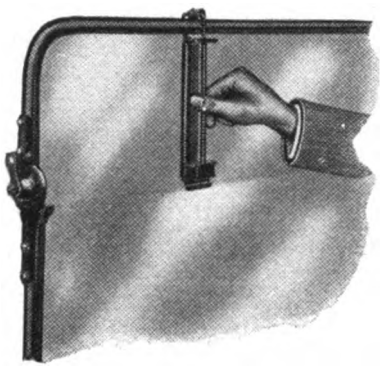
"Safety First" Oil Signal.

Eagleine Motor Oils and Gear Oil. Lubricating oil for internal combustion engines must be of the proper consistency, so that it flows freely and holds its viscosity, with a certain percentage of the resistance particles of the natural oil extracted and yet not too great a percentage of the lubricating base of the natural mineral oil removed, which gives it its quality for efficient lubrication. To ascertain the proper proportions in the refining of as near perfect a lubricant for gasoline engines as possible requires long years of experience. Eagleine motor oils were put through the most exhaustive tests for a period of 20 years and now have reached the zenith of perfection. They are refined from the natural mineral oil and contain no animal or vegetable fats that tend to decompose into glycerol and acids, which lower the lubricating efficiency. Eagleine gear oil is especially compounded to the exact consistency for efficient lubrication of transmission and differential gears and its use has shown that there is less wear on the gears and thereby upkeep expense is reduced to the minimum.

Eagleine motor oils and gear oil are put up in the company's trade marked containers that serve the purpose of cleanliness and convenience in use, as well as assuring the customers no spurious substitutes.

Eagleine motor oils and gear oil are prepared and marketed by Eagle Oil and Supply Co., 44-5-6 India St., Boston, Mass.

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The Clean-All Windshield Cleaner.

The Nazett Combination Burning-In and Work Out Machine will permit the average mechanic with a limited experience to burn-in all the main bearing and connecting rod bearings of a Ford engine in one hour's time and have a better job than could otherwise be obtained in several hours time. The machine is designed to be operated by a minimum amount of power, as most shops are equipped with small motors. It is amply provided with adjustments, provision being made for raising and lowering the cylinder block to allow proper alignment by means of positive and quick adjusting blocks, which slide in accurately milled grooves in the main bed plate. An expanding clutch is used with hard wood friction blocks controlled with turn buckles. Bronze shoes are used in the clutch throw out collars.

To test the tightness of the bearings during the burning in operation the knurled handle clutch lever is removed from its socket and inserted in the socket provided on the clutch arm, which enables the operator to turn the crankshaft by hand. It is not necessary to remove the cylinder block from the machine to tighten bearings or inspect same, as this may be done while the machine is running. Openings are provided in the main bed plate through which the valves are free to operate and permit the easy replacement of pistons. In fact it is not necessary to remove the block from the machine until it is ready to be bolted to the crank case. The heavy flywheel when under motion helps to maintain a more constant speed with a minimum amount of power.

To convert the machine into a work-out machine it is simply necessary to raise the two side arms, lock them into a vertical position and place the assembled engine into position. Convenient adjustments are properly provided for to align same. It is very essential to work the engine for a short time after it has been overhauled and this test will enable the mechanic to discover such defects as piston slaps, noisy timing gears and oil leaks. The machine is provided with brackets to attach the regular Ford coil box. A gasoline tank is equipped to connect the carburetor. Water connections for engine and oil drip pan are furnished.

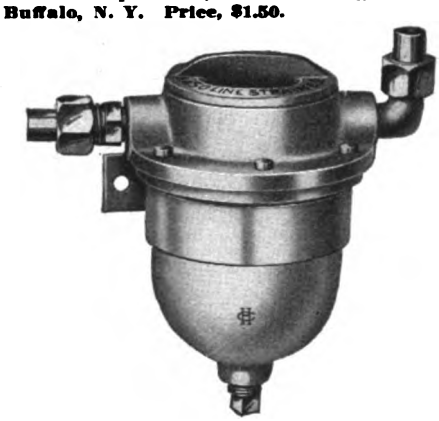
Manufactured by H. H. Nazett, Eldora, Ia. Price complete, $250.

The Walker Steelbilt Shock Absorbers for Fords smooth out rough going—soak up the shocks and cradle the Ford in a big easy car sway, the makers claim. They are built entirely of steel with the springs extra long, oil tempered and of the utmost durability. The spring bolts are turned from cold rolled steel and hardened—equipped with oilers. The free unhampered action given to both the coils and springs require no sliding parts and they are thoroughly safe and as strong as steel can be in every section.

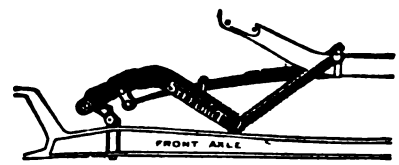
Manufactured by the Walker Manufacturing Co., 31 Hamilton St., Racine, Wis. Price, $7.50 per pair.

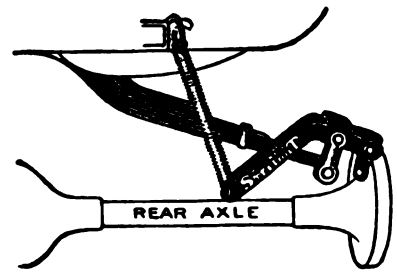
The Clean-All Windshield Cleaner by its extreme neatness adds to the appearance of any automobile. This cleaner cannot rust or rattle. The windshield can be turned down with the cleaner attached and it is so designed that it cannot break the glass. It is always out of the driver's way, but never out of his reach and is constructed of the best material obtainable for hard practical use.

Manufactured by the Clean-All Windshield Corporation, 257 Washington St., Buffalo, N. Y. Price, $1.50.



Holtzer-Cabot Gasoline Strainer.





Walker Steelbilt Shock Absorbers.



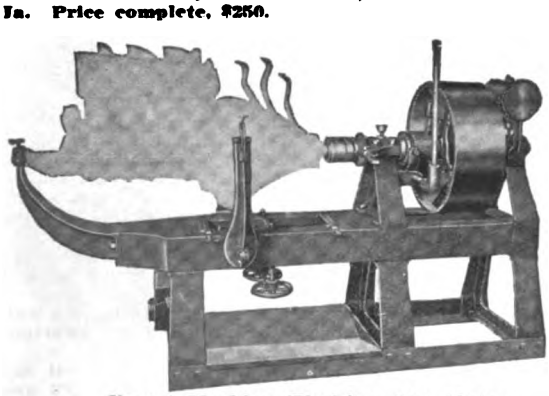
The Presto Bulb Tester.

Ekern's Portable Work Bench and Engine Stand is especially designed for use in Ford repair shops, although there are various uses to which it can be put in general repair shops. The stand is mounted on three four-inch diameter wheels. The rear castor wheel is constructed so that by pulling a plunger pin this castor will swing up off the floor and the stand will rest solidly upon its legs. It has two large trays 22x24 inches, where the workman can place his tools or engine parts. A Ford engine assembly can be attached to the stand by the two cap screws which hold the water inlet connection on the engine. The part attached to the engine will revolve in the clamp on the stand, adjusting the engine to the position most convenient to be worked upon. The bench is also equipped with a vise, which has a three-inch jaw with a four-inch opening. This vise will handle any work required in overhauling the Ford engine or other work of a similar nature.

Manufactured by the Ekern Bros. Manufacturing Co., Flandreau, S. D., and distributed by H. G. Pare, 1410-14 S. Michigan Blvd., Chicago, Ill. Write for prices and literature.

The Holtzer-Cabot Gasoline Strainer is made of an aluminum casting with a bronze wire screen of 120 mesh with over six square inches of surface. The gasoline enters through the bottom of the strainer and passes up through the screen, thus making it possible to remove all dirt and water that falls to the bottom of the strainer, through the screw plug at the bottom. The wire screen cap can be taken out by unscrewing the top wing nuts.

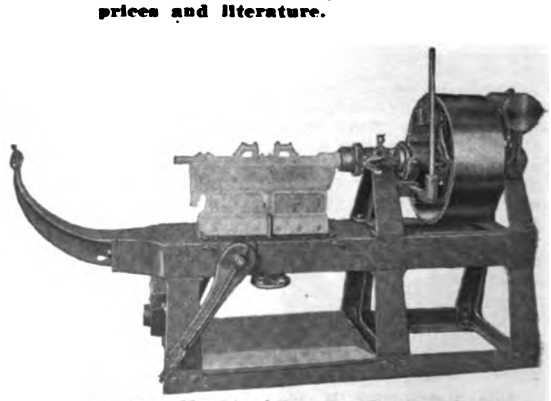
Manufactured by the Holtzer-Cabot Electric Co., Roxbury, Mass. Write for prices and literature.



Nazett Machine Working Out Motor.

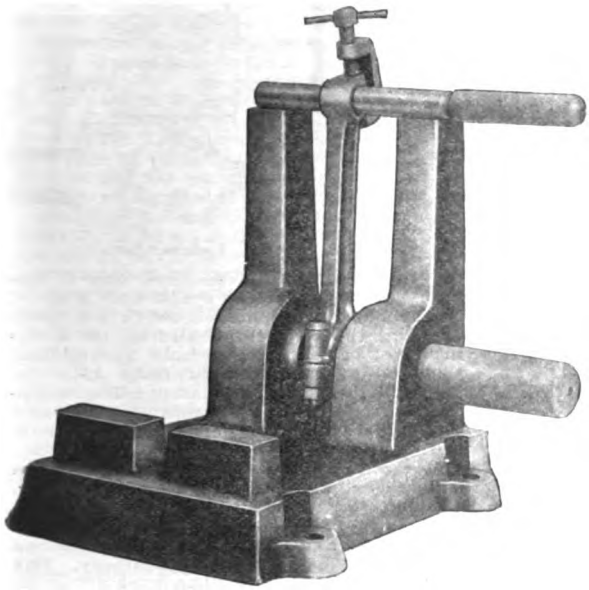


Ekern's Portable Work Bench and Engine Stand.



Nazett Machine Burning-In Bearings.

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Nasett Connecting Rod Jig.

The Nasett Connecting Rod Jig is an aligning fixture for testing the alignment of new and used connecting rods for Ford engines. It is conservatively estimated that 50 per cent. of new rods are not true, and 97 per cent. of the rods in engines which have been overhauled are out of alignment. This condition invariably causing a knock which many a mechanic has looked for but could not find. The pins in the tool are made of high carbon steel, double heat treated, hardened and ground. The large pin is accurately fitted into steel bushings, which are also hardened and ground.

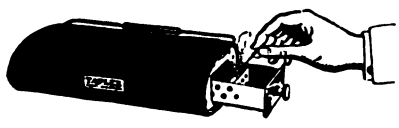
Manufactured by H. H. Nasett, Eldora, Ia. Price, $30.

The Foster Auto Repair Creeper is mounted on ball bearing, free running castors and is durably finished in baked-on black Japan. Metallic throughout it stands up under severe usage and its advantages over the wooden creeper are evident. The galvanized link spring fabric supports the body comfortably and the head rests upon a cotton filled pillow. The give of the springs allows free movement and an adjustable arm anchors the creeper firmly to the floor so that the workman can exert his full strength.

Manufactured by Foster Bros. Manufacturing Co., Utica, N. Y. Write for prices and literature.

The Magic Vulcanizer is an ingenious little device that vulcanizes patches on inner tubes in five minutes time, disregarding all weather conditions. The patch is simple and effective. A lighted match applied to the chemically treated cartridge in the top of the tin cap provides the heat units necessary to penetrate the patch and in a few minutes the tube is perfectly vulcanized and ready for instant use. There is no flame, no danger of fire and the strongest wind cannot blow it out. The complete outfit, including clamp and 12 vulcanizing patches take up small space in the tool box.

Manufactured by Magic Auto Devices Co., Inc., Lynbrook, N. Y. Price, $2. Extra patches, the dozen, $1.



Taplex Foot Warmer.



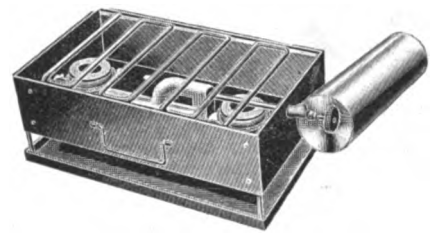
Magic Vulcanizer.



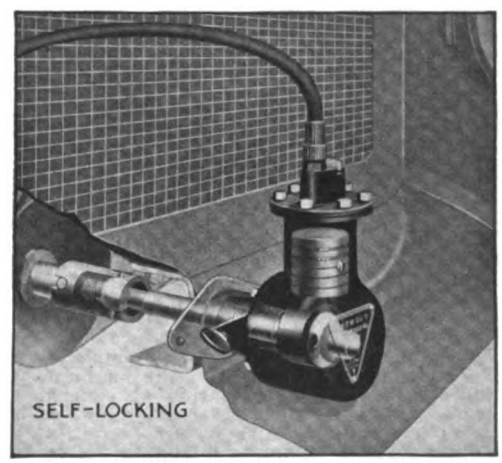
Foster Auto Repair Creeper.

The American Folding Camp Stove is just the thing for the camping or touring trip. It is efficient and dependable. Equipped with two powerful burners it uses gasoline, burning equally well outdoors as indoors. Weighing eight pounds its size folded is 3½x8x14 inches. It is simple and easy to operate, as there is nothing to set up or assemble. It can also be supplied with heating drum.

Manufactured by the American Gas Machine Co., Albert Lea, Minn. Write for prices and literature.



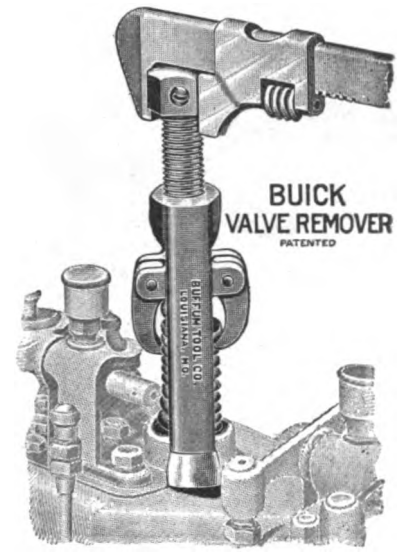
American Folding Camp Stove.



"Detroit" Crankshaft Tire Pump.

The Taplex Foot Warmer is for use in the automobile, camp, porch and for all other outdoor uses. On the coldest days it gives one that full measure of comfort and protection which makes the automobile ride a pleasure. It is lighted with a match and the fuel burns without flame or smoke, thus making it absolutely safe. The case is made of indestructible steel with nickel plated ends and a double asbestos lining.

Manufactured by the Taplex Corporation, 47 West 34th St., New York City, N. Y. Weight 5 pounds. No. 14, $5; No. 20, $7.50. Extra fuel, 12 bricks to a box, $1.



Buffum Buick Valve Remover.

The Buffum Buick Valve Remover is quick, sure and safe, obviating the danger of bending washers, valve stems and valve springs or breaking the valve cage. It lifts the valve straight up with a strong, steady pull and fits Buick engines of all models since 1912. It is light and compact and occupies no more space than an ordinary wrench, being easily carried in the tool box.

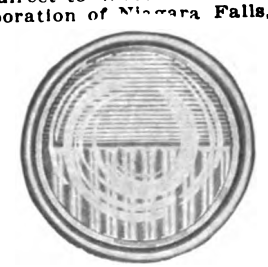
Manufactured by the Buffum Tool Co., Louisiana, Mo. Price, $2.

The "Detroit" Crankshaft Tire Pump is driven directly from the front end of the engine crankshaft, being attached in exactly the same manner that the hand crank is connected. It is locked in position and held from turning by a clamp or screw and is connected to the end of the engine crankshaft by a short ball joint shaft or coupling, which drives it. Each downward stroke of the piston draws in clean, cool air, and each upward stroke forces it through the tube into the tire. The only attention necessary is a spoonful of hard graphite grease about once a season. It is made as carefully as a little engine. Cylinders, crankshaft and pistons are ground to close limit. Regular engine type high compression piston rings are used and stand engine type valves are used. The outfit includes a 14 foot hose and connection for pocket gauge.

Manufactured by the Detroit Accessories Corporation, Gratiot and Fisher Aves., Detroit, Mich. Price $12. Write for size adapted to your car.

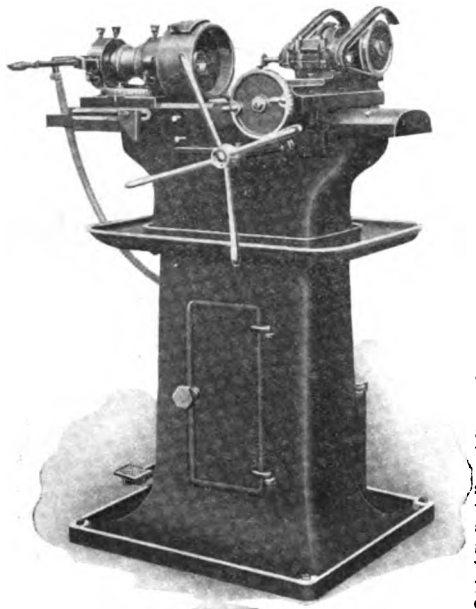
The Woodworth Clear Light Lens for automobile head lights is a prism lens especially designed to prevent glare without absorbing light, but by directing its rays where they are most required. The upper half of the lens is so designed that it throws the light to the sides of the road and the lower half is designed to throw the rays down on the road itself. The lens is made in all of the commonly used sizes.

Dealers or jobbers can obtain a very favorable proposition on these lenses by writing direct to Woodworth Manufacturing Corporation of Niagara Falls, N. Y.



Woodworth Clear Light Lens.

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Capital Internal Grinder.

The Capital Internal Grinder employs heavy construction with correct proportioning of detail and many labor saving devices. The spindles are fitted with ball bearings, all parts being machined in jigs, sliding parts scraped to surface plates and cylindrical parts fitted by grinding. The stand is a one-piece casting 29½ inches high. The base is bolted to the stand or can be mounted upon a bench and weighs 200 pounds. The table is a single unit, fitting in the ways on the top of the base, and is operated by the pinion and rack. The work spindle head is mounted upon a plate fitted to the table and the position of this plate is altered by loosening the lock bolts. It can be set to any angle up to 90 degrees. The grinding wheel head is built up in two sections. The wheel spindle forms the front part and the drive shaft head the rear part. The wheel spindle is designed to run at high speeds. The countershaft is in three sections, drive shaft, intermediate shaft and main shaft. A complete water attachment may be had if so desired.

Manufactured by the Lansing Stamping and Tool Co., Lansing, Mich. Write for prices and catalogue.

The Knickerbocker "Made Right" Motor Luncheon Outfit, as illustrated, is combined luncheon and suit case arranged, so that the entire equipment may be removed and the case used as an ordinary suit case when desired. This style is made in three sizes, suitable and equipped as desired for two, four, six or seven persons, and are furnished complete with cutlery and dishes or with just food boxes as desired.

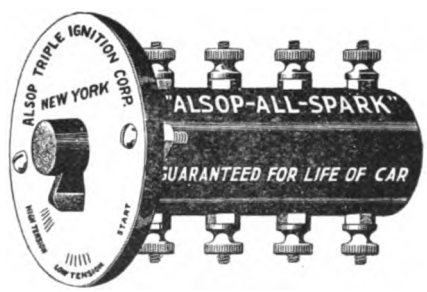


Knickerbocker Motor Luncheon Outfit.

In addition the Knickerbocker "Pullman Diner" luncheon case and table and the Convertible Auto Refrigerator luncheon case and trunk are popular styles, offering most practical and convenient features. All cases have compartments provided for carrying two or more of any standard thermos or vacuum bottles or jars.

Manufactured by the Knickerbocker Case Co., Fulton and Clinton Sts., Chicago, Ill. Prices range from $13 to $42.50.

The "Alsop-All-Spark" is claimed by the makers to make possible the use of old dead carbon choked spark plugs with as good results as can be gotten from new ones without this device. It goes much further than the saving of spark plugs, as the reinforced spark is a more positive exploder of the gasoline. When it is considered that there are more than 5400 sparks per minute in a six-cylinder engine, which runs 3600 revolutions per minute and only a certain per cent. explode the gas, it can be readily seen that a device which gives such a powerful spark will penetrate through heavy oil and spark dead carbonized plugs, will certainly cause a great deal more explosions per spark delivered.



"Alsop-All-Spark."

With this device it is seldom ever necessary to change spark plugs, as a slight turn of dial on the dash will raise the voltage to such an extent that it will overcome any misfires, no matter in what condition the plug may become.

The device screws upon the dashboard and is controlled by a dial inside the car. It is connected between the spark plugs and distributor and will not interfere with any present equipment. The makers claim it to work equally well upon any ignition system. Easily attached in a few minutes.

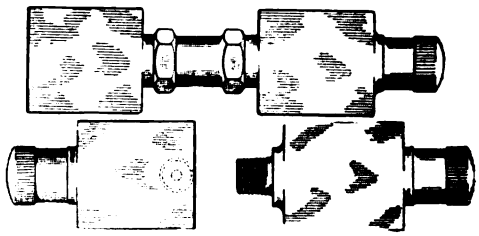
Manufactured by the Alsop Triple Ignition Corporation, 1765 Broadway, New York City, N. Y. Price for all four cylinder cars, trucks and tractors, $6.

The Meckel Lubricator is a novel device, which lubricates springs, shackles and spindle bolts with oil instead of grease. The great difficulty in oil lubrication has been the control of the fluid and has been surmounted in this device by the use of a valve actuated by vibration, which permits the oil to flow only when the car is in motion. Stopping the car stops the flow of oil. The manufacturers claim the elimination of squeaks and rattles, freedom from attention except for refilling the reservoirs every 2500 miles. The attachment is simple. It fits into any of the bushings of the bolts and can be applied to a car by any one. It is made in three styles, each adapted to a special duty.

Manufactured by the Meckel Lubricator Co., 1507 Grace Ave., Lakewood, O. Write for prices and literature.

The Tong-Em-On Vulcanizer consists of a nickel plated vulcanizing tong, two copper pans—puncture and blow out sizes—and one dozen "Risk's Riskless" perforated fuses and patches.

To use, simply roughen the surface of



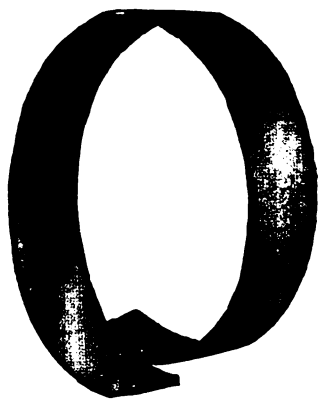
The Meckel Lubricator.

the tube thoroughly, peel off one of the gum patches from the stack and stick it to the bottom of pan. Remove the cloth and pull the tong tight, sliding the floating rivet back in slot to hold tong closed. Put two of the patented fuses into the pan and light with a match. The whole process requires but five minutes time and the makers claim a permanent repair is the result.

Manufactured by the Tong-Em-On Vulcanizer Co., 626 Plymouth building, Minneapolis, Minn. Price, $1.75.

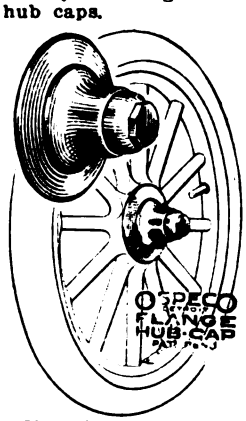
Rusco Brake Lining is manufactured by specially constructed machinery. The basis is selected long fiber pure asbestos, expertly interwoven with tempered brass wire. No cotton or copper filling is used. This makes an extremely durable, but soft and flexible fabric of uniform quality throughout. A secret compound is used to permeate the brake lining and render it impervious to water, oil, heat and dirt.

Manufactured by the Russell Manufacturing Co., Middletown, Conn. Write for prices and literature.

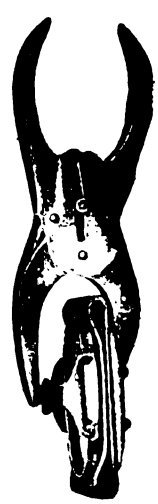


Rusco Brake Lining.

The Ospeco Flange Hub Cap is designed to replace the original Ford hub cap. They are rugged and distinctive in design and add materially to the appearance of the car. They are easily installed by merely screwing them on just like the old hub caps.



Manufactured by the Michigan Auto Products Co., Ford Building, Detroit, Mich., and Cincinnati, O. Price, $5 per set of four.



Tong-Em-On Vulcanizer.

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The Bowser "Chief Sentry" Gasoline Outfit is so designed that it will accurately discharge on a complete stroke of the plunger five gallons of gasoline. Any intermediate gallon, half gallon or quart can be accurately discharged by the use of the graduated scale, which is attached to the pump. The pump is built entirely of metal, strong and durably constructed. All working parts are carefully protected by the outer casing and are machined and accurately fitted. All joints that come in contact with gasoline are absolutely tight, thus preventing accidental evaporation or leakage. The cylinder is made of seamless brass tubing with no joints to break loose or cause trouble. The valves, valve seats, stuffing boxes, etc., are made of selected materials suitable for the liquids to be handled. The pump is equipped with an electric light post completely wired, with a socket at the top for the bulb. A white opal glass globe is furnished, which affords protection for the light bulb and makes an effective advertisement, as well as a bright light. The pump is effectively wired for connection to local service.

Manufactured by the S. F. Bowser & Co., Inc., Fort Wayne, Ind. Write for prices and literature.

The Apco Brake Shoe Adjuster fills a long needed want for the Ford car. Without these the Ford brake shoes when half worn are useless and of course must be removed. With this adjuster, which consists of specially hardened steel thimbles, which are driven over the brake shoe cams, the brake shoes may be totally worn. After their removal the adjusters may be used over again, as they do not wear out. The installation is a matter of a few minutes using a hammer. Each set is packed in a box weighing two ounces.

Manufactured by the Apco Manufacturing Co., Providence, R. I. Write for prices and literature.

The Zorger Glar-Kilr Lens is composed of sectional cylinders one-half inch in width, with the axis horizontal. These sections are adjusted so that the rays cross or come to a focus three inches in front of the reflector. This gives a one-half inch spread every three inches or a two-inch spread every foot. The sectional cylinders are made so that the light does not attain an altitude of more than 42 inches in 200 feet. At 200 feet the spread from each one-half inch section of the glaring half of the reflector is 400 inches, 90 per cent. of which is stated to be below horizontal is diluted by diffusion approximately 800 times, not nearly sufficient to dazzle an approaching driver. The maker states that by using the cylinder he gets the same diffusion as any diffusing lens and in addition gets refraction or bending down of the rays. This lens bends rays of light down and diffuses them along the road where they are needed. The range of lighting from it is from 300 to 500 feet in front of the car, and a wide side light is thrown, showing clearly the side of the road.

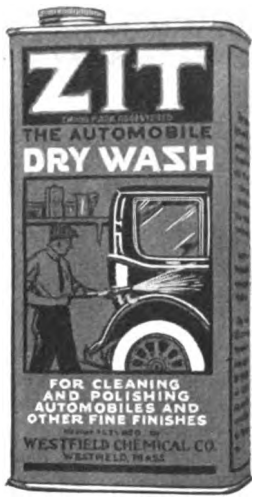
Manufactured by the Zorger Lens Co., Inc., Champaign, Ill. Write for prices and literature.

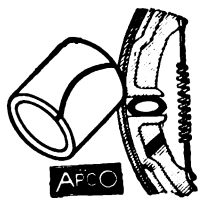
The Niswander Rim Remover removes and replaces demountable rims in automobile tires. The contracting and expanding is done by right and left hand threaded rods operated by a hand wheel, which give an even and steady pull, contracting the rim from one to four inches, and the rim hooks, together with the rim braces, are so constructed that the harder the pull the tighter they grip the rim in either operation. It weighs 2½ pounds and folds to a length of nine inches, enabling it to be easily carried in the tool box. This tool will work successfully on any split rim and will save time, labor and the wear and tear upon the rim necessary without its use.

Manufactured by Niswander Manufacturing Co., Quincy, Ill. Price, $3.50.

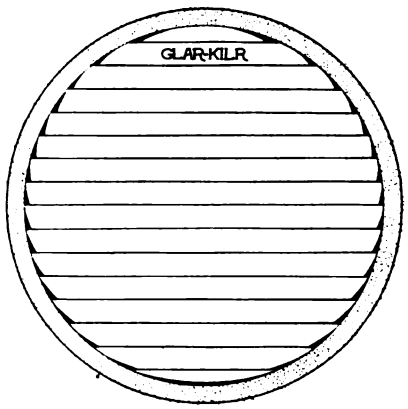


Bowser "Chief Sentry" Gasoline Outfit.





Apco Brake Shoe Adjuster.



Zorger Glar-Kilr Lens.



Ever Safe Emergency Brake Shoe.



National Rubber Tire Filler.

Zit is an automobile dry wash—it takes off everything except a heavy coating of mud. It leaves a dry finish that makes the car shine. This polish restores the luster and keeps the finish from checking and cracking. It is good for furniture, as well as automobiles.

Compounded by the Westfield Chemical Co., Westfield, Mass. Write for prices and literature.

Blaxshine is jet black and of excellent covering quality, producing a black, durable finish with a shining surface like a new car fresh from the factory. The makers claim that it will stand up under any degree of heat, being especially adapted for re-enameling hoods, radiators and metal running boards. It can be put on by anyone after the car is cleaned and the enamel will dry during the night, leaving the car ready for use the next day. The package includes Blaxshine for one car, fine vulcanized brush, painter's cup, mineral wood, sandpaper and your personal monogram in gold shipped by post in corru-

Manufactured by the Twin City Varnish Co., 208 N. Wabash Ave., Chicago, Ill. Price, $2.85.

The Ever Safe Emergency Brake Shoes for Fords eliminates the drag on the brakes by allowing the expander to always lay flat with the jaws of the shoe, thus saving gas and oil. It is adjustable to the drum by enlarging the diameter of the shoe itself. By springing the jaws to one side, washers may be added or removed to take up for the wear of lining or drum, thereby allowing the expander or cam to lay flat with the jaws and a much longer travel of expander at all times, leaving the shoe suspended and contracted to its smallest diameter. It is easily installed without the drilling of holes and it takes the place of the regular cast iron brake shoe.

Manufactured by the Never Break Products Co., Bangor, Pa. Write for prices and literature.

National Rubber Tire Filler takes the place of air in the tire, doing away with the inner tube, thus making punctures rim cuts and blow outs impossible. It is made in the best quality rubber, cut into small particles and vulcanized together in such a manner that the makers claim it will produce all the resiliency and easy riding qualities of air. It is not melted and run into the tire, but is moulded in cylindrical forms to fit the various sized casings, and is placed in the casings in lengths, after which the casing is pressed onto the rim with special tools provided for the purpose, giving the same pressure as a casing well inflated with air. When the casing wears out the filler can be removed and replaced in new casings.

Manufactured by the National Rubber Filler Co., Midlothian, Texas. Write for prices and literature.

The Oxygen Tank Truck consists of a pair of wheels on a short axle with a steel strap holding the oxygen tank that can be contracted to sufficiently hold the tank. The handle of the truck is of steel strap with a bolt and wing nut with iron handles welded on.

Manufactured by the Auto Repair and Storage Battery Works, 41 Union St., Portland, Me. Price of truck and handles, $7.50.



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Chalmers Takes Optimistic View of Situation

"We Have Been Assured by the War Industries Board," He Says, "That If Steel and Other Materials Are Available After The War Program Is Taken Care of, Our Industry Will Get Its Share and the Board Has Promised That We Will Get a Square Deal

Hugh Chalmers, vice president of the National Automobile Chamber of Commerce, upon his return to Detroit from Washington after the recent hearing when the War Industries Board issued its order for the automobile industry to get on a 100 per cent. war basis by Jan. 1, 1918, stated that assurance was given him that the motor car manufacturers would obtain steel and supplies if there is any left after the needs of the war industries have been supplied. He has issued the following letter to the members of the N. A. C. C. bearing on the situation:

"Supplementing what Mr. Reeves has written to you with reference to the letters from the War Industries Board, it is only fair to say that we did not know that any publicity would be given to this letter, because we were assured by the members of the board it was not their intention to give any to this subject. They denied having given out any of the objectionable publicity in the past and agreed with us that we should have as little as possible.

"The attitude of the War Industries Board was this:

"It was very much pleased at the spirit shown by our members in voting for the 50 per cent. curtailment of passenger cars, but it felt it could not accept that agreement without obligating itself, indirectly at least, to give us materials on a 50 per cent. basis. This, of course, they cannot guarantee to do, either for us or for any other so-called non-war industry.

"The board feels that the curtailment will have to be greater than 50 per cent., but at this last meeting the board expressed the wish and desire for the automobile industry to continue in business; that they realized the importance of this industry to the country in its regular business of making passenger cars, and its particular importance to the government at this time in carrying out its war program.

"The suggestion that the industry go to war work up to 100 per cent. is, I believe, what the War Industries Board would consider an ideal situation, and I think this statement is made more as a warning to our companies to take on war work. The War Industries Board feels, of course, that any company's interests, that is engaged in non-war work, is best served if it has 100 per cent. war work, but the board never has in any conference expressed a desire for a 100 per cent. curtailment of passenger cars. But it feels that the curtailment will have to be greater than 50 per cent. The War Industries Board has never discussed anything more drastic than a 75 per cent. curtailment.

"We have been assured again by the War Industries Board that if steel and other materials are available after the war program is taken care of, our industry will get its share, and the board has promised that we will get a square deal. But it will not under any circumstances make any definite commitments to our industry or to any other so-called non-war industry.

"We were somewhat handicapped in our discussion at this last meeting because the inventories were not all in and the board felt that it could not deal properly with the situation until these figures were available. However, after these figures are completed we are to have another meeting with them, when it will be determined what steel and other materials can be released to the passenger car manufacturers, and on what basis.

"I have written to President Clifton stating it may be advisable to hold another membership meeting after the inventories are completed, and we have had a chance to discuss the matter again with the War Industries Board. In order to expedite matters I would suggest that if you have not sent in your inventory of materials that you do so at once, as failure to do so is only holding up further negotiations with the board for the materials which we need."

Another Advance in Price of Ford Cars

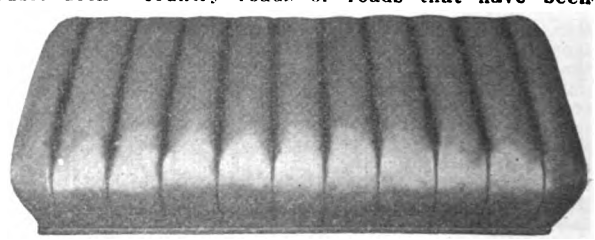
Increase of $75 Brings Touring Model Up to $525, Within $25 of 1914-15 Price.

The Ford Motor Co. has again increased the price of the Ford car, adding $75 on the price of the touring model, which has been selling at $450 since February of the present year, when a previous advance of $90 had raised the price to that figure.

In August, 1914, when the European war broke out, the Ford touring car sold at $550. A year later the price was reduced $60 to $490 and in August, 1916, another cut of $130 a car was made, bringing the price down to $360. This was the lowest level reached and compares with $525, the new price that went into effect this month.

The American Cushion Spring represents a new type of cushion spring brought forth to eliminate the rough riding qualities of many cars.

This type of cushion is fitted with what is known as the compound double deck de luxe spring. The upper deck of the spring contains approximately 120 coils of very light gauge wire. These coils are oil tempered and enameled so as to prevent any possible chance of deterioration or rust. After these springs have been enameled they are put in cloth covered pockets. These small pockets are then joined together by a universal metal hinged joint on the second coil down, leaving the upper coils perfectly free and loose, so that each spring works absolutely independent of the other, the entire 120 springs coming into action as the cushion is depressed, the upper deck lifting approximately 33 1/3 per cent. of the load that is put upon the cushion. The lower deck of the spring contains 42 very heavy springs, which are assembled and held together by a woven wire fabric that holds the springs in an upright position, at the same time making a strong and substantial base for the upper springs to rest upon. When the upper spring is compressed flat the lower spring is compressed approximately 50 per cent. of the height; in other words, the lower spring lifts 66 2/3 per cent. of the load that is put upon it, the upper deck lifting 33 1/3 per cent. of the load, thereby eliminating all of the rough jolts that a person would otherwise get riding over the rough country roads or roads that have been badly cut up by heavy trucks or other traffic, which is so often encountered during the hot season of the year.



This type of cushion is made to fit all cars that are built in this country regardless of size or price. Some of the more expensive cars are now using this type of spring but there are many of them that of course have not adopted the same. They are sent out on a money back proposition, allowing the customer to use them for five days and if not satisfied then they can be returned to the factory and the entire amount of the purchase price will be refunded in full.

Manufactured by the American Cushion and Spring Co., Kalamazoo, Mich. Write for prices and literature.

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N. A. D. A. Explains Position in the Conservation Campaign

THE National Automobile Dealers' Association has issued a bulletin to members explaining its position in connection with the conservation campaign which it inaugurated as a means of aiding the war and the misunderstanding that arose over its objects, which were for the purpose of conserving necessary supplies and labor to aid in winning the war. The situation is presented as follows:

"Some apprehension was manifested during the past two weeks on account of an Associated Press story, which appeared in the newspapers under a Washington date line, to the effect that the oil division of the War Industries Board had not issued an order prohibiting the sale of gasoline nights and Sundays, indicating that this move was for the purpose of conserving gasoline and oil, and on the strength of this story hundreds of letters and telegrams from all parts of the country reached the President's office, asking for an explanation. To all of these the following telegram was sent:

"Closing was never urged to conserve gasoline but man power. Keeping open requires labor which is manifestly for the purpose of making it easier to use automobiles for pleasure purposes. As labor is one of the scarcest commodities, every saving in this direction at this time is not only necessary, but imperative. While there is no shortage of gasoline, yet it must be used rationally. There is not enough to waste and it behooves not only owners, but dealers to conserve as much as possible by cutting out unnecessary use, not because of present necessity, but against possibility of the future. National association encourages needful use, but discourages unnecessary use of automobiles in order to dispel idea that automobiles are purely pleasure vehicles and therefore nonessential. Closing will do this most effectively."

A further statement was issued from the President's office, same having been sent to all the motor trade journals and many of the newspapers throughout the country, which fully covers the situation and which indicates the position taken by the N. A. D. A. in this conservation movement. The statement is as follows:

"There seems to be some misunderstanding in conception regarding the night and Sunday closing recommendations, made by the War Service Committee, particularly as it applies to gasoline and other supplies which might indicate that the curtailment of the general use of automobiles is contemplated, or that a shortage of gasoline exists. Nothing is farther from the facts, as the object of the suggestions when fully in force will tend to foster and encourage the utility use of an automobile to the fullest extent, and will cater to those who use cars for such purposes.

"As night and Sunday usage of an automobile is mainly for pleasure purposes, there is naturally a feeling that this can be reduced without any great hardship on the part of the owners of the cars, and it is freely stated that practically all other lines of industry are willingly curtailing the unnecessary from their business, and it is therefore only equitable that the automobile industry do likewise.

"The keeping open of service stations, oil and supply depots, requires labor, which is manifestly for the purpose of making it easier to use automobiles for pleasure purposes, and as labor is one of the scarcest commodities at this time every saving in this direction is not only necessary, but imperative. There is plenty of gasoline and oil for automobile use, if it is rationally and sensibly used, but there will not be enough if the automobile user continues to waste it by using his automobile unnecessarily.

"Therefore, it behooves not only the dealers, but the owners as well, to conserve in this direction as much as possible, not so much on account of present necessity as against the possibility of the future. Whatever small additional trouble it may be for the owner to obtain supplies on Saturday, it is so negative that no patriotic owner will object.

"Sensible reasonable use of the automobile on the part of the owner, and reasonable sensible attitude on the part of the automobile dealer, garage man, supply depot and oil station, is in itself an absolute assurance that no drastic order will be given requiring some limited use of automobiles, or of gasoline, oil or other supplies, and the possibility of a 'seven motorless Sundays' order, or any similar edict is very remote, and the closing movement on the part of the industry indicates very plainly its sincere desire to help in every way possible to bring about a speedy conclusion of the war and shows without question that the automobile industry is willing to conserve in all of the material that it uses in the operation of its product, as well as save the man power it requires to maintain the establishments considered necessary in the past."

In further support of the position taken by the national association that a reasonable sensible use of gasoline will prevent the necessity of drastic action is seen in the statement issued by the U. S. Fuel Administration Oil Division, under date of Aug. 1, which is as follows:

"United States Fuel Administration,
Oil Division, Washington, D. C.
M. L. Requa, Director.

Aug. 1, 1918.

"The question of gasoline conservation is of pressing importance.

"If the consumer will exercise care against waste it will postpone and probably avert the necessity of severe restrictive action.

"But if gasoline and other oil products are not conserved drastic means of control will be imperative if we are to meet the needs of our armies, those of the allies and our home demands.

"The consuming public should realize the seriousness of the situation, and yet there is no wish to enforce regulation that will hamper or restrict the legitimate use of automobiles, motor boats or gasoline engines. If everyone will be careful not to waste gasoline and lubricating oil there will be plenty to go around.

"But there is not enough gasoline and oil to meet all needs unless the thoughtless and careless waste is eliminated.

"A poster calling attention to this situation is now in preparation. It is desired to display the poster conspicuously at every gasoline filling station, in every public garage and wherever it will be seen by the consumer. The gasoline and oil distributing companies of the country must be relied upon to distribute these posters and other printed matter that is to follow, to awaken the consumer to the importance of conservation.

"It is believed that your organization stands ready to co-operate with this bureau in this work, and that you will see that posters sent you will be displayed where gasoline and oil consumers cannot fail to see them.

"Please let us know the number of posters you will require, estimating an average of three posters for each gasoline filling station and public garage you serve.

"A card for convenience in supplying this information is enclosed. Posters will be ready for distribution within a few days. Therefore please return the card without delay and oblige

Sincerely yours,

"United States Fuel Administration,
"Oil Division, Bureau of Conservation.

"By C. C. Winningham,
"Chief of Gasoline Section."

A careful summing up of the situation in every locality is absolutely necessary in order that the automobile dealer may be in position to render the government the greatest possible assistance in this critical time, and nothing can assist more than the whole-hearted support of the entire automobile industry, including all of its kindred lines, in the conservation program now under way in the automobile trade.

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Missouri Permits the Driveaway of Automobiles

The National Automobile Dealers' Association has again been instrumental in overcoming difficulties of automobile dealers—this time in Missouri. Recently several dealers were held up at Shelbina, Mo., by an over-officious night watchman. The dealers in question were not only delayed, but were fined. The national association was immediately appealed to and the president at once communicated with Governor Gardner.

The governor immediately took the situation up with the secretary of state, John L. Sullivan, with the suggestion that matters be clarified. Mr. Sullivan advised the president's office under date of July 23 that he had addressed communications to the prosecuting attorney of Shelby county and the justice before whom the dealers were prosecuted at Shelbina, calling their attention to a request from Washington that dealers be allowed to drive cars in trains of 50 if necessary, displaying only the one set of plates—one attached to the front of the first car and the other to the rear of the last car.

Mr. Sullivan further advised that in accordance with the practise of a number of other states of the Union (which was due to activities of the national association) it was the desire of his department that dealers be allowed to travel unmolested when displaying the dealers' tags as above described. Mr. Sullivan advises he has replied to inquiries throughout the state that dealers in transit be not disturbed, and it is to be expected that no further inconvenience will be experienced in this connection.

LEATHER SUBSTITUTES GAIN WIDESPREAD POPULARITY.

Leather substitutes are materials produced from raw cotton, and they so closely resemble the real leather that few experts can detect the difference.

On account of climatic conditions in certain sections of the United States, particularly the South, leather upholstery on furniture and automobiles is not as satisfactory as the materials now being used as substitutes for leather because of the formation of what is known as "mould," a white fungus growth, which destroys the beauty of leather.

The formation of mould on leather causes a clouded, spotted surface, that finally destroys its texture, thereby rendering useless chair, couch or automobile upholstery, and necessitating new coverings and a continuous outlay of money.

The day of the leather substitute is here and here to stay, its many advantages assuring its success. When labor was cheap and plentiful, keeping this mould wiped off leather goods in damp climates was a possible undertaking, but now that help is expensive and scarce, a labor saving material must be used. The value of the substitutes for upholstery is therefore obvious as they do not mould, fade or deteriorate. They have the further virtue of being water, grease and vermin proof.

In addition to the superior wearing qualities of pyroxylin coated substitutes in certain climates, there is just now a strong reason for using them in every part of the country. Our government has asked that we use substitutes of all kinds whenever and wherever possible. At this time there is a shortage of leather, which is indispensable in the making of shoes, belts, harness, puttees and other necessary articles for the boys who are fighting for us that we may enjoy the liberty of a world wide democracy. Now that our country is facing this leather shortage let us respond to the call "Use Leather Substitutes."

By putting before the public the value of leather substitutes as proof against climatic conditions, and by pointing out the duty of truly patriotic American citizens to conserve leather, the furniture and automobile manufacturers can render valuable service to their customers and to the country.

DU PONT ADVERTISING DEPARTMENT OCCUPIES IMMENSE OFFICE.

E. I. Du Pont de Nemours & Co. of Wilmington, Del., has sprung an innovation in advertising circles by equipping an immense office building solely for the use of its advertising division.

Through the expansion of its varied lines and the acquisition by purchase of a number of allied industries the advertising division of this great company has increased to such an extent that from a pay roll of 11 people in 1911, it has grown until it now numbers a force of 200 advertising experts and assistants, under the able direction of George Frank Lord, the company's director of advertising.

In the columns of Kaiser Wilhelm's subsidized press considerable space has been devoted of late to gloating over the alleged abandonment of foreign advertising and curtailment of home advertising by American manufacturers. The Du Pont company, however, is one to which the stricture of the Kaiser's press does not apply. Instead of reducing its advertising expenditures the Du Pont company doubled its appropriation for the present year over that of the previous year and is planning to increase the sum still further for 1919.

The courageous action of the Du Pont company in doubling its advertising expense at a time when business conditions bordered on the chaotic served no doubt as an inspiration to other great companies which have since been following in the Du Pont footsteps and are keeping their names and products constantly before the public eye.

Another important feature of Du Pont advertising is the pioneer idea of group advertising of related industries, an idea which is certain to become typical of American advertising in the future.

Contrary to a generally accepted belief, the Du Pont company is not engaged solely in the manufacture of industrial and military explosives. In reality it is the greatest diversified industrial enterprise in the world. It manufactures more than 1000 peace products, which are widely used in the arts, sciences, industries and the home.

The advertising aims of the company are directed toward furnishing the public with complete information and education as to the uses and proper methods of use of their multiplicity of products. In consequence the importance of the advertising division has increased in proportion to the growth and expansion of the company.

The Du Pont American industries and the advertising managers of the individual companies are: The Arlington Works, A. R. Kneale; Du Pont & Harrison Chemical Works, L. B. Steele; Du Pont Fabrikoid Co., A. H. Berwald; Du Pont Dye Works, S. F. Withe; Harrison & Bridgeport Paint Works, J. Coleman Bentley; Industrial Explosives, E. F. Carley; Agricultural Explosives, F. W. Wilson; Sporting Powders, Edmund Doremus.

The Canadian advertising of the Arlington Co., Ltd., and the Du Pont Fabrikoid Co., Ltd., both of Canada, is in charge of J. M. Cane. In addition to the above mentioned industries the company recently acquired a large interest in the General Motors Co. In view of the thoroughness with which the Du Pont Co. applies itself to any proposition, it is safe to predict that its venture into this field will have a marked influence on the future of the automobile business in this country.

Increase of Freight Rates On Auto Bodies

Members of the N. A. D. A. have been advised of the decision of the Interstate Commerce Commission, rendered July 14, which allows railroads to class automobile bodies over 36 inches in height as products which should carry four times first class freight rates of automobile bodies that are less than 36 inches in height. This decision was rendered in connection with a complaint entered last January by the National Automobile Chamber of Commerce.

This decision apparently will affect the form in which shipments of truck cabs and bodies are made by the shipper. Dealers should advise body factories to make shipments in conformity with the classification under 36 inches in heighth when possible in order to obtain the minimum freight rate.

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ALL SPACE FOR N. A. A. A. J. SHOW IN CHICAGO SUBSCRIBED.

At the meeting of the show committee of the National Association of Automobile Accessory Jobbers, at which the drawings for space for the forthcoming exposition to be held under the auspices of the organization, it was announced that all the space was substantially subscribed for on both floors of the Temple in Chicago, with the exception of about 20 spaces, and this allotment did not include a number of applications that the committee was advised were in the mails.

INSTRUCTIVE BOOKLET ON FORD TRANSMISSION ACTION.

A new booklet, just off the press, goes thoroughly into the question of transmission action of Fords. It tells how a smoother working Ford can be had simply by taking proper thought in the selection of transmission lining. The causes of the chattering and vibration which attends the transmission action in the Ford are analyzed, and the method of overcoming them clearly shown.

One of the features of the booklet, which is named "The Story of Cork Insert," is views of the factory where cork insert transmission lining is prepared. The big machines are shown which punch 24,000 sets of linings in an eight-hour working day. Also the rooms of



girls are pictured in the act of setting the corks into the linings. One girl can set 10,000 corks in a day.

Another department of interest is the pages which give the experiences of Ford owners in the use of cork insert. After reading of the long mileage secured and the smoothness and quietness of operation, it is not difficult to understand why cork insert transmission lining has come into such extensive use during its first year on the market.

A copy of the booklet, "The Story of Cork Insert," will be mailed to any one who will address request to Advance Automobile Accessories Corporation, 56 E. Randolph St., Chicago.

Alarming Theft Of Automobiles In St. Louis

Over 1095 Cars, Valued at $3,000,000, Stolen Since First of Year, and 303 Not Recovered.

The police department of St. Louis, Mo., has added 28 men to its automobile squad, making 35 in all, who are devoting their entire time to suppress the alarming growth in the theft of cars. Since the first of the year 1095 cars were stolen, of which number 303 have never been recovered.

FIRESTONE STOCKHOLDERS GET EXTRA DIVIDEND.

The directors of the Firestone Tire and Rubber Co., Akron, O., have declared an extra dividend of $1 per share on the common stock, payable to stockholders on Sept. 20. The notification of the dividend was sent to the stockholders in a circular signed by President H. S. Firestone, in which he made brief comment on the affairs of the company. The circular was as follows:

"At the meeting of the board of directors, held Dec. 15, 1917, the following resolution was adopted:

"Resolved, That it is the sense of the board that in the year 1918, if business shall develop as it now promises, dividends shall be paid on the common stock of the company, aggregating $6 per share for the year.

"Commencing with the dividend of Dec. 20, 1917, the quarterly dividends have been at the rate of $5 per share, per year. We are very glad to advise that our business justifies paying the additional $1 per share dividend for this year, and the following resolution was passed by the board of directors today:

"Resolved, That for the quarter ending Aug. 31, 1918, a dividend of $1.25 per share be declared upon the issued common capital stock of the company, payable Sept. 20, 1918, to stockholders of record Sept. 10, 1918, and

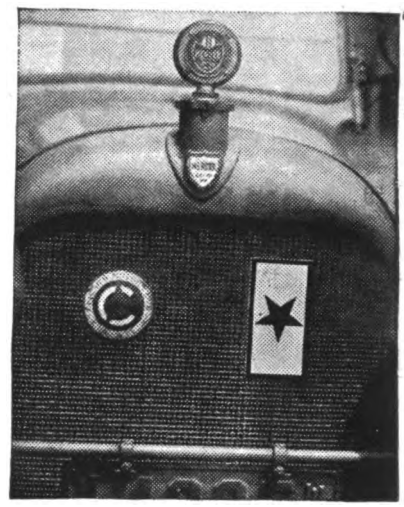
"Be it further Resolved, That a special dividend of $1 per share be declared upon the issued common capital stock of the company, payable Sept. 20, 1918, to stockholders of record Sept. 10, 1918.

"Allowing for the restrictions on the importation of crude rubber and the production of pneumatic tires, we estimate our sales will approximate $75,000,000 for the fiscal year. Our solid tire business has increased greatly, and we are diverting our plant and labor used in pneumatic tires to rubberized fabric, balloons, gas masks and other war essentials.

"Our profits for the year cannot be determined until after inventory, Oct. 31, but we feel safe in stating that after caring for dividends, taxes and liberal reserves, a very satisfactory amount will be carried to surplus account."

PATRIOTIC AUTOMOBILE RADIATOR SERVICE FLAG ORNAMENT.

Every one with a member of his family in the service has good cause to be proud of the fact and the display of a service emblem indicating the fact is also a service to the nation as well, as it maintains before the public the fact of the large number of young men who are serving their country, thus keeping the spirit of patriotism constantly enlivened. The service flag idea has been appropriately adapted for the motorist in the form of a handsome steel radiator emblem, as shown in the accompanying cut. It is finished in red and blue colors that will not fade or become dim, and is 3 1/3x5¾ inches. It is made of 28 gauge steel, has beveled edges and is complete and ready to attach.



Patriotic Automobile Radiator Service Flag Emblems, as they are called, sell at 50 cents each and the makers offer liberal discounts to dealers and jobbers, which will be given upon application. The makers are the L. & M. Service Specialty Co., 504 Sherman St., Chicago, Ill.

WEBBER CARBURETORS UNDER THOROUGH TEST IN NEW YORK.

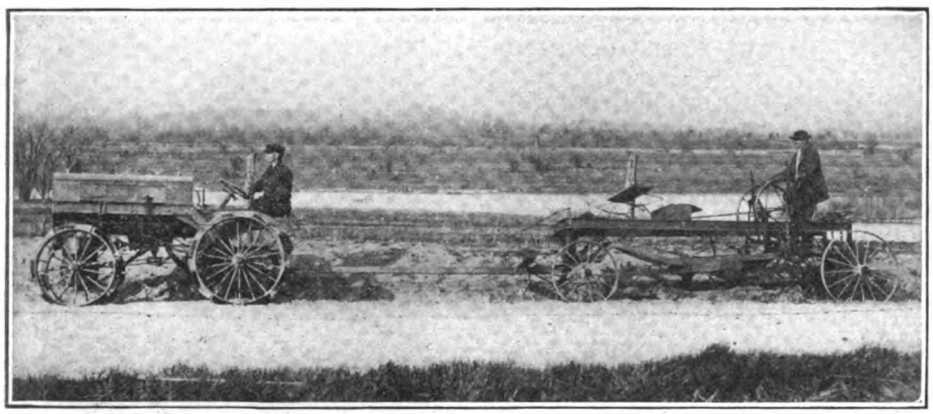
The Webber Manufacturing Co., Boston, Mass., through its sales representatives in New York City, has been making some very thorough tests of the Webber carburetor on various makes of cars. Some of the big truck concerns of that city are demonstrating that the Webber carburetor lives up to the many claims its manufacturers are making for it, and the service that is being rendered at the factory branch, 1765 Broadway, which is in charge of Henry S. Jacques, is building up a reputation for the company.

Agents for the State of Ohio were recently appointed and the territory is being rapidly opened up on the demonstration of the carburetor. William S. De Ott, 1397 W. 37th St., Cleveland, O., is distributing the "Webber" in Northern Ohio, and the Eagle Auto Co., 424 South Main St., Dayton, O., is handling the Southern Ohio territory.

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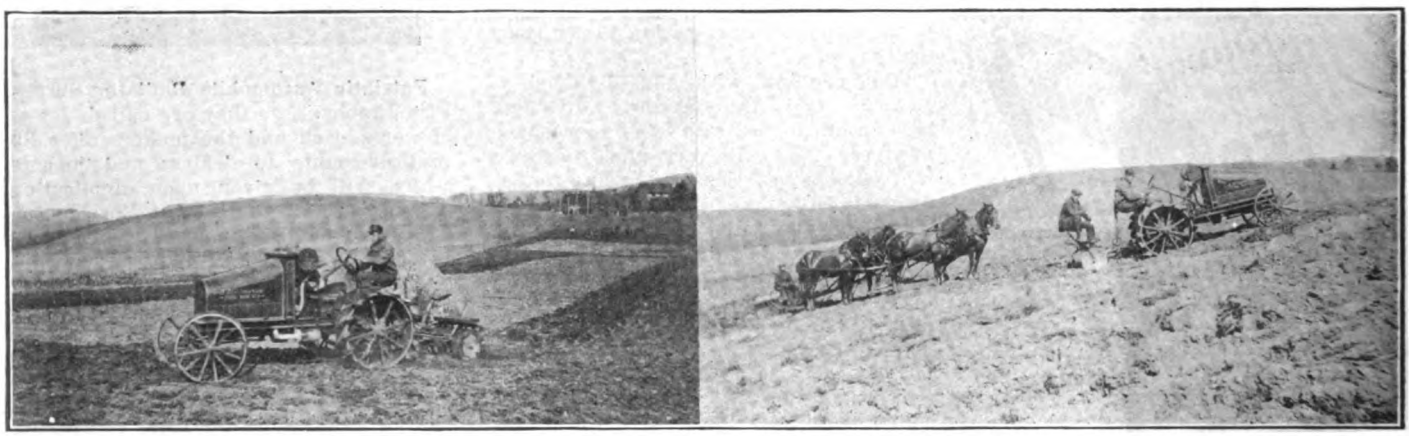


Tractor Has Wide Working Scope on Field and Road and Is Efficient On Grades

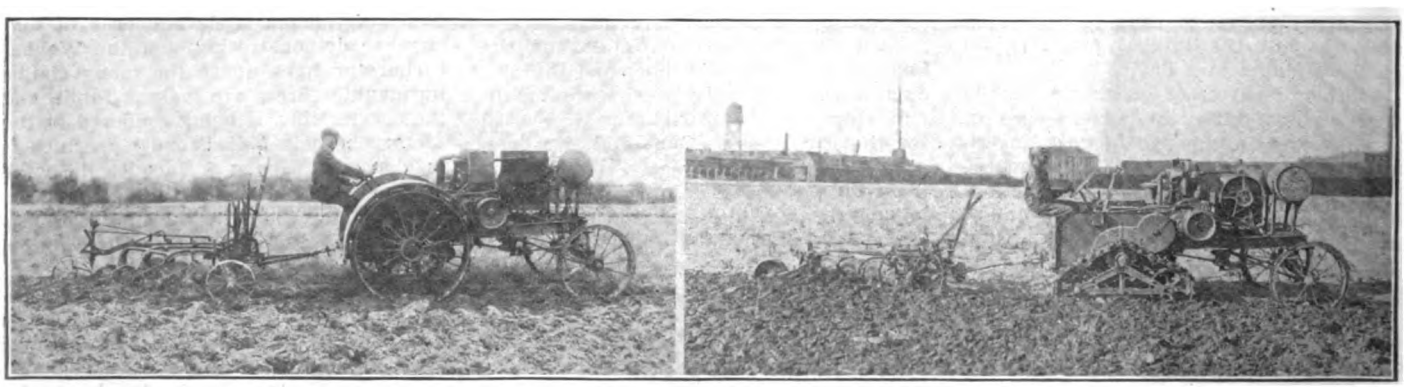


Top View Shows Acme Tractor Driven by Tracks Climbing 45-Degree Hill—Note the Wall Line of Buildings.

To the Left Is a Fitch Four-Drive Tractor Hauling a Road Grader, This Being a Work for Which the Machine Having Complete Traction Is Specially Suited.



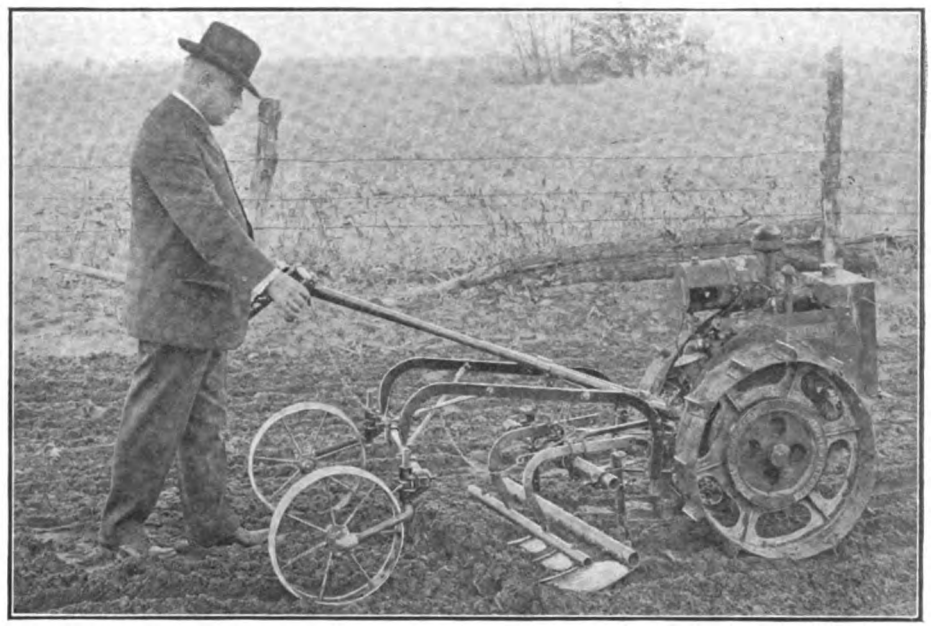
Cultivating a White Mountain Farm with an International Tractor: At Left, Disc Harrowing a Big Field with a Two-Gang Equipment; at Right, Work Done by the Tractor Requires a Four-Horse Team. Note the Heavy Grade of the Hill.

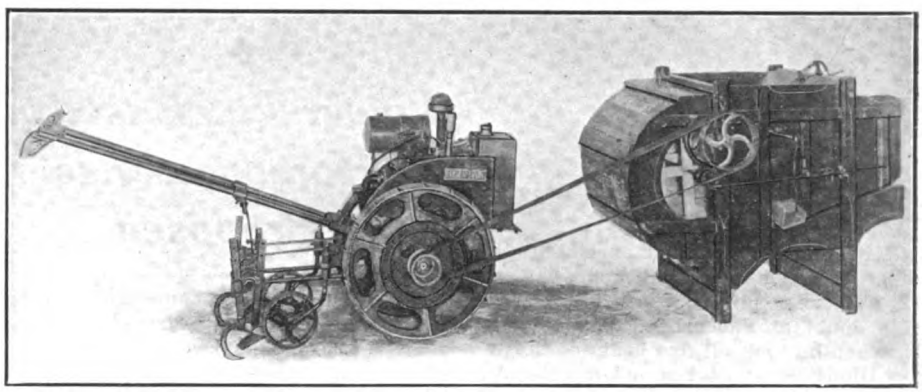


The Acme Tractor with Both Types of Drive: At Left, Wheel Driven, Hauling Gang of Plows; at Right, Discing in Soft Ground with Track Equipment.

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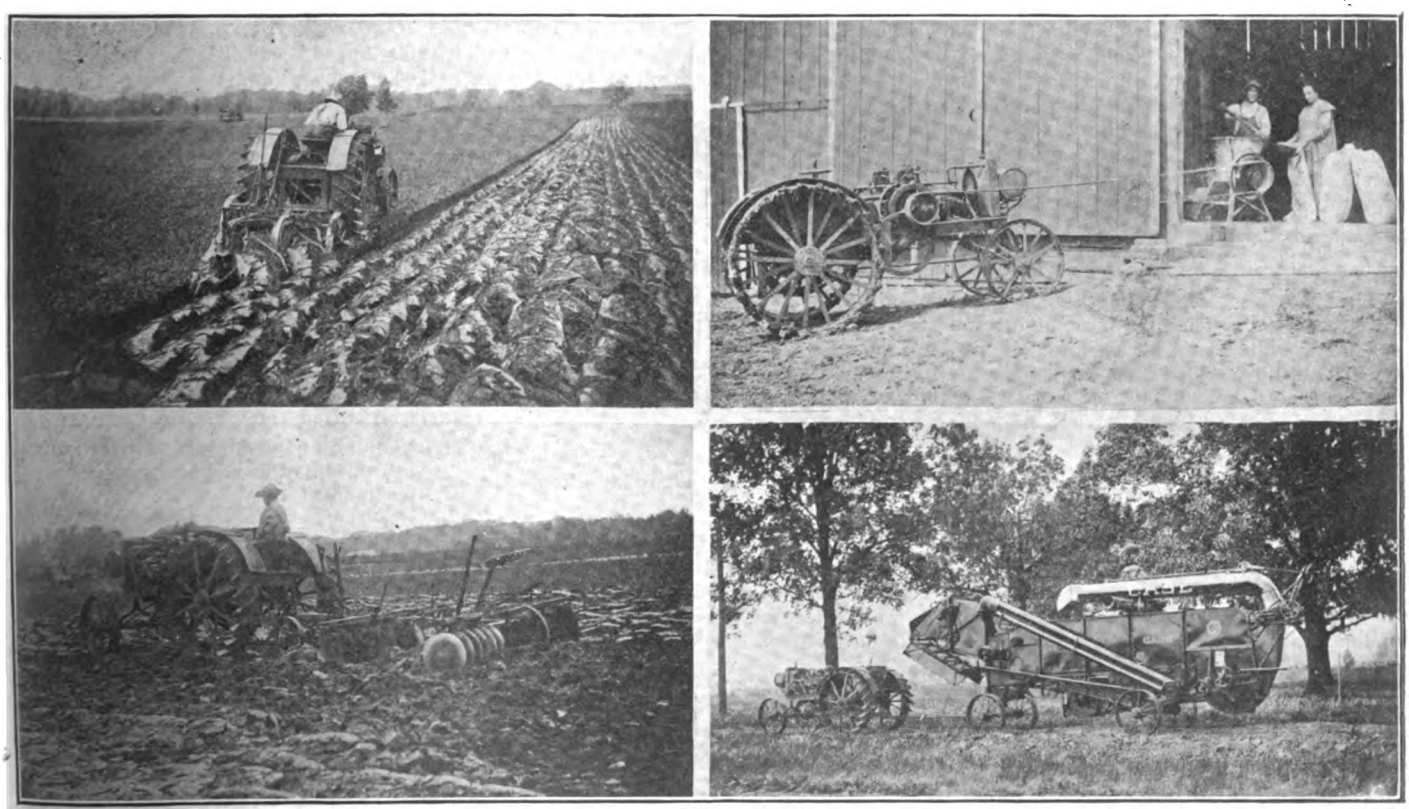
Light Powered Tractors Can Be Used for Many Purposes On Large or Small Farms





Top View Shows Beeman Garden Tractor in Use with Cultivating Implement Attached. It Will Draw a Seven-Inch Plow or Other Light Cultivating Tools.

To the Right, the Beeman Tractor Is Shown with Small Wheel Attached for Use as Portable Power Plant.



Examples of Light Tractor Work: Upper Left, Whitney Unit Hauling a Two-Gang 14-Inch Bottom Plow; Upper Right, Driving a Feed Grinder; Lower Left, Drawing a Disc Harrow; Lower Right, Pulling a Threshing Machine in a Field.

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Ralph De Palma Whitewashes the Field

Wins Every Event in International Sweepstakes at Sheepshead Bay and Establishes Several New Records—Averages Nearly 116 M. P. H. for Two Laps



Ralph De Palma, the Winner, Who Becomes World's Premier Racing Car Driver.

Ralph De Palma demonstrated the superiority of his Packard racing car and his skill as a pilot beyond the vistages of a doubt at Sheepshead Bay on Aug. 17, when he took all five heats of the International Sweepstakes and incidentally established several new track records.

The race was run in five heats of two miles, 10 miles, 20 miles, 30 miles and 50 miles respectively, each carrying six points to the credit of the winner, making a total of 30 for De Palma. Ralph Mulford, driving a Duesenberg, took second honors with 22 points, and Dario Resta third with 19 points. Arthur Duray, the Belgian race driver, received six points. Louis Chevrolet and Ira Vail both had bad luck throughout and failed to score.

The pace that De Palma set in each event was too much for his competitors. In the two-mile event he averaged better than 110 miles per hour, eclipsing the former record held by Resta by 7.25 seconds, and in the 10-mile event he covered in 5:23.80, which is just a second better than his own previous world's record of 5:24.80 made in Chicago, and at the date of 111 miles an hour. The last two miles of the heat were covered in 1:02.2, or at the rate of 115¾ miles per hour. He made the 20-mile distance in 10:51.60, which time is over a second under the record, while in the 30-mile event his time was 16:31.20, or 2:24.9 better than the previous record set by Johnny Aitken at Indianapolis. He continued the record breaking pace in the 50-mile event, which he covered in 27:29.20, which was better by 45.43 seconds than the previous record made by Dario Resta on the same track last year.



Ralph Mulford, Who Gave the Leader a Close Race and Captured Second Money.

Lower Tax Based on Horsepower is Proposed

Ways and Means Committee Changes Plan for Levying Against Automobile Owners.

The Ways and Means Committee of Congress have abandoned their plan to place a flat arbitrary tax on automobiles based on the original cost price and will incorporate in the revenue bill a tax based on the horsepower of passenger cars and trucks. This will be levied as follows:

23 horsepower or less	$10
24 to 30 horsepower	20
31 to 40 horsepower	30
More than 40 horsepower	50

Under this tax the government will raise but $70,000,000 as compared with $100,000,000 under the first plan.



Dario Resta, the 1916 Champion, Who Took Third Honors.

CALENDAR OF SHOWS AND RACES

UNIONTOWN, PA., SEPT. 2—Race, auspices Uniontown Speedway Association.

INDIANAPOLIS, IND., SEPT. 2-7—Automotive Show in conjunction with Indiana State Fair; auspices Indianapolis Automobile Trade Association; John Orman, Manager.

CHICAGO, ILL., SEPT. 7—Racing meet, Chicago Speedway.

OAKLAND, CAL., Sept. 9-OCT. 6—Pacific Coast Land and Industrial Exposition, Civic Auditorium.

CHICAGO, ILL., SEPT. 14-21—National Truck, Tractor and Accessory Show under the auspices of the Automotive and Accessories Exposition, Inc., Municipal Pier. H. V. Buelow, manager

NEW YORK, N. Y., SEPT. 21—Racing Meet, Sheepshead Bay, auspices Sheepshead Speedway Motor Club, Inc. (Sanction pending.)

MONTREAL, CAN., SEPT. 17-19—Farm Tractor Demonstration for Eastern Canada.

DETROIT, MICH., SEPT. 23-4-5—Convention, National Association of Purchasing Agents; Hotel Pontchartrain.

CINCINNATI, O., OCT. 6—Racing Meet.

DALLAS, TEX., OCT. 14-27—Seventh Annual Automobile Show; Texas State Fair.

OTTOWA, ONT., OCT. 16-18—International Plowing Match and Tractor and Farm Machinery Demonstration. Experimental Farm.

CHICAGO, ILL., Oct. 28-Nov. 2—Convention and Automotive Equipment Exhibit, National Association of Automobile Accessory Jobbers.

DES MOINES, IA., Dec. 2-5—Tractor Show in connection with Convention of the Iowa Implement Dealers' Association.

KANSAS CITY, MO., FEB. 10-15, 1919—National Tractor Show, auspices Kansas City Tractor Club; Guy E. Hall, Secretary.

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Tarvia Road at Camp Devens, Ayer, Mass

Tarvia Road at Camp Dix, Wrightstown, N. J.

Tarvia Roads in U. S. Camps—

THE Government has built sixteen new camp-cities or cantonments for housing and caring for the new armies.

A cantonment is a miniature city of 40,000 inhabitants with the heaviest kind of traffic on the avenues.

Constant lines of automobiles, auto-trucks, mule teams, horses, artillery, and thousands of marching men fill the arteries of traffic. The road problems have been intricate and varied and above all speed in construction has been paramount.

Old types of roads, the corduroy and the dirt road, were not adequate to the needs of these camps. *Good roads had to be supplied* in order to keep the tremendous camp-traffic moving.

Many miles of Tarvia roads were promptly built and are now giving entire satisfaction—

First—because they are smooth, durable and waterproof.

Second—because they are neither dusty nor muddy.

Third—because they are quickly built, and are easy to maintain in good condition.

Fourth—because they are the most economical under the circumstances.

The use of Tarvia in these camps is an illustration of the versatility of the material and the service rendered by The Barrett Company.

The Tarvia was ready and the expert advice that went with it was put freely at the service of the Government.

Whether a road-binder, a dust-layer, a road-preserver, or a patching material was needed, there was a grade of Tarvia to fit.

Illustrated booklet free on request.

Special Service Department

This company has a corps of trained engineers and chemists who have given years of study to modern road problems. The advice of these men may be had for the asking by any one interested.

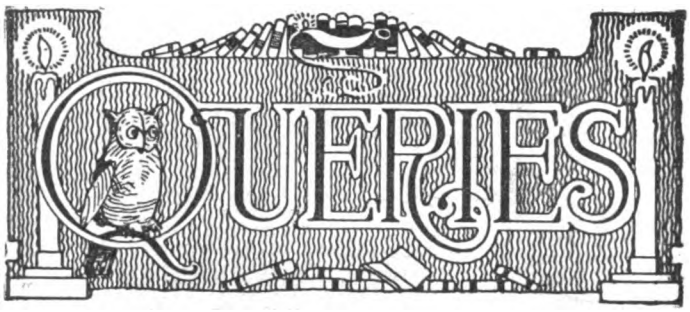
If you will write to the nearest office regarding road problems and conditions in your vicinity, the matter will have prompt attention.

The Barrett Company

New York Chicago Philadelphia Boston St. Louis
Cleveland Cincinnati Pittsburgh Detroit Birmingham
Kansas City Minneapolis Nashville Salt Lake City Seattle
Peoria Atlanta Duluth Milwaukee Bangor Washington
Johnstown Lebanon Youngstown Toledo Columbus
Richmond Latrobe Bethlehem Elizabeth Buffalo Baltimore

THE BARRETT COMPANY, Limited: Montreal Toronto
Winnipeg Vancouver St. John, N. B. Halifax, N. S. Sydney, N. S.

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NOTICE TO READERS.

THIS department contains the Mechanical Editor's answers to readers' inquiries. It is open to every subscriber. If any part of your car is not operating satisfactorily, or if you desire information regarding operating, maintaining or repairing motor cars, do not hesitate to lay your troubles before him. He will answer promptly and fully, either by mail or in these columns, as you direct. This service is free to every subscriber, and is often the means of saving considerable money that otherwise would be spent with a garage man. Letters should always be signed with the writer's full name and address, and the car or part in question should be properly identified, by mentioning the maker's name, model, year of production or other distinguishing feature. Address all inquiries to the Mechanical Editor.

THE AUTOMOBILE JOURNAL IDEA EXCHANGE.

For the benefit of readers of the Queries column it has been decided to conduct in this department a more widespread interchange of ideas. To this end the attention of readers is invited to the following question:

WHAT TIRE TOOLS AND TIRE REPAIR EQUIPMENT DO YOU CONSIDER ESSENTIAL FOR THE CAR AND WHAT IS THE BEST WAY TO USE THEM?

To the writer of the best answer to the above question $2.50 will be paid. For the next best answer $1 will be paid. The best answers received will be published in the September issue. Answers to the question should be in the hands of the editors by the 10th of September. The contest is open to every one.

HOW DO YOU CARE FOR THE STORAGE BATTERY AND KEEP IT IN GOOD WORKING CONDITION?

(R. S. Albertson, Benton, Pa.)

Best Letter.

There are several makes of storage batteries in use on motor cars today. With proper care they will perform their function perfectly.

The writer is acquainted with several men who expect too much from their batteries and consequently have had to replace them with new ones, or new parts at least, which expense and trouble could easily have been avoided.

The storage battery should be examined twice a month to ascertain the depth of liquid over each plate. Also the strength of each cell. The writer's experience with a three cell Willard battery has proven successful. The battery has been in use since Dec. 31, 1915, and has never had any repairs other than adding a little distilled water at different times and at the present time will test (each cell) 1.260. Before storage batteries were manufactured the car owners had no other way of starting the engine only by the use of the crank and thought nothing of it. If car owners would use the crank a little on frosty mornings instead of grinding the starting motor, the battery would be more efficient.

The depth of the liquid over the plates should be about three-quarters of an inch. If it is any deeper the liquid is liable to slop over through the three vent holes in the screw caps, which condition will cause the exterior of the battery to corrode.

If the liquid is allowed to evaporate until the plates become bare, they will warp, causing a short circuit, which will require a new set of plates, costing about $10.

Distilled water can be obtained from any drug store or garage.

The writer places a large glass bowl on a box, up from the ground and away from trees or buildings, where no foreign matter can get into the bowl and when there is a nice still rain a supply of pure water is secured.

After obtaining enough of the water I strain same through a clean cloth and pour it into a bottle and fill the neck of the bottle to the cork. Then it is placed where it is cool for future use.

The testing of the cells for their strength is ascertained by the hydrometer, which can be purchased anywhere for a small sum. Any one wishing to prolong the life of a battery must expect to tend to it regularly.

In starting the engine on a cold morning fill the radiator with warm water. Cover with robe or blanket and let stand a few minutes. Then instead of using the starter use the hand crank. Spin the engine a few times with the throttle opened to draw up the gasoline from the carburetor. Open the priming cups and with an oil can put in a small amount of gasoline. Close the priming cups, snap on the switch and generally the engine will start at the first turn, thus saving a large amount of current which would otherwise be drawn from the battery had the self starter been used.

After the engine is thoroughly warmed up the starting motor can be used without exhausting the battery so fast, as the engine will start more quickly.

Those who reside in the country are sometimes compelled to abandon the use of their car on account of deep snow, as such was the case last winter. In such cases I remove the battery from the car and place it in the cellar, where it does not freeze until road conditions are better.

There is more than one way to destroy the life of a battery. Some engines get their spark from the storage battery instead of the magneto. For instance, in running your car into the garage, if you should happen to stall the engine just after entering and should forget to turn off the switch. If the car remained that way all night possibly the battery would have to be recharged before the starter would turn over. Just as soon as the switch is turned on the ammeter hand will show a discharge.

Constant running of the car at night when the lights have to be used and not much running in the day time will eventually run the battery low. By using the crank a little when the weather is cold and examining the battery regularly twice a month, I think the most of us will find our battery working O K.

Second Best Letter.

(R. L. Prindle, N. Abington, Mass.)

Regular, intelligent care and inspection given the storage battery is time well spent, as it will forestall serious troubles which are sure to develop if one neglects this unit of the car's electrical system. The battery requires the same amount of care as any other part of the car, and if the small things are taken care of the bigger things cannot develop. A large number of cars and trucks today are equipped with a storage battery only and are dependent on a charging station to keep these charged. But in cars having a complete electrical system the generator feeds the battery, though there is a chance for the battery to go wrong even then. In every case it requires the same care.

In this age of conservation we must conserve the supply of every metal, particularly brass, copper, aluminum and steel. Some of these metals are used in spark plug shells and on many other places about the car, and with proper care these will not have to be replaced before their natural length of normal use.

The storage battery is a good example of this, as its make up consists largely of lead and sulphuric acid, which are war materials of a high value. The average life of a battery today is about 12 months. With care and consideration it could be lengthened to four or five years and perhaps six.

The best solution of this problem is to purchase a battery syringe and hydrometer combined of a non fragile kind. Those made of celluloid will outlast the others if one is careful and carries it in the car.

Once a week unscrew the caps and with the hydrometer draw some of the electrolite when the hydrometer is floating freely and note the reading. In every case the solution should be returned to the cell it was taken from. Do the same with each cell. These readings are taken before the addition of

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distilled water. In a fully charged battery the reading would be between 1.275 and 1.300. Never allow this to fall below 1.100, as this indicates a complete discharge.

Nothing but distilled water can be put into a battery unless one is an expert. Very often the reading is found to be low, and many persons are of the opinion that if acid was put in it would bring the electrolite up to the proper strength. As a matter of fact this practise would prove fatal to the battery, because there is already plenty of acid there, but it is in the plates. When it is charged the acid is driven out into the electrolite again, the solution becoming so strong as to ruin it by sulphation.

Lack of brilliance in the headlights, or becoming brighter when the engine is speeded up, or the starter not sufficiently strong to spin the engine as rapidly as before. Where these conditions hold the battery should be carefully looked over and the charging system also by an expert. Watch the ammeter, as this is the pulse of the electrical system.

There is less resistance set up to the passing of the current if all terminals and connections are tight, clean and not corroded by action of spilled acid. Prevent sulphation of terminals by first cleaning with a piece of waste dipped in ammonia, wiping dry and coating with vaseline or cup grease. This is very apt to take place particularly if brass and copper comes in contact with the lead binding posts. Electrolite creeps up from the battery to the point of contact and attacks the lead, forming what is known as layers of lead sulphate between the binding post and the end of the wire, which will result in a case of insulphation, which means further delivery of current will stop. Care should be exercised to have contacts clean and set up with a wrench or pliers and are covered with cup grease. This is an effective means of preventing electrolite from creeping into the crevices, as the terminals are sealed.

Avoid short circuits. Never lay anything across the top of the battery. A rapid discharge of current would take place, also sulphation, together with buckling of plates, and tend to break the separators. Another cause of short life is poor insulation of the wiring. Renew old or oil soaked wires and support others lacking proper fastening.

A leaky battery may mean a broken jar.

Spilled acid about the battery or battery box should always be wiped up with waste soaked in ammonia.

Clamp down securely with clamps provided for this purpose.

The generator will have to be kept in good order so as to give a steady flow of current to the battery.

The battery will never fail you if you give it a chance. Nothing ever happened without a cause.

WHAT GASKETING METHODS HAVE YOU FOUND BEST TO KEEP YOUR ENGINE TIGHT AND INSURE IT AGAINST OIL LEAKAGE?

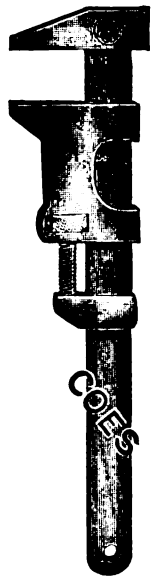
(R. L. Prindle, N. Abington, Mass.)

Best Letter.

The proper maintenance of gaskets throughout the engine is highly important, as when any of these become broken or flattened they no longer serve their purpose, and as a result leakage in these places and engine efficiency is greatly impaired. There are two places about the engine that poor gasketing will cause missing and uneven running or stop the engine entirely. These being when the detachable head is fitted to the engine block and at the joints between the carburetor and manifold and at the point between manifold and engine. If any leaks are present at any of these places the mixture will be diluted to such an extent that the charge becomes unburnable.

To determine whether any leaks are present about the cylinder block, note where the block is marked by black, brown or rusty streaks. A new gasket well covered on both sides with shellac is the remedy which must be tightened before becoming dry. Gaskets for this purpose may be obtained from any automobile supply house, or with care, any one may make these from heavy wrapping paper. One should use a sharp knife, using the old gasket for a pattern. In replacing the detachable head great care should be used in setting up the studs uniformly, giving each a turn until all are tight, for if this is not done danger of warping is present, making a tight fit impossible.

COES *The Standard WRENCH*



WRENCHES that are made for the hardest service. They do not break but grip and hold and their efficiency never lessens.

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In renewing the paper gasketing between the lower half of crank case proceed the same as with cylinder head.

Hot gas joints, such as found about the valves and throughout the exhaust system, call for copper-covered asbestos, while dry gas joints call for coated asbestos.

Leaks about the inlet manifold are best solved by removing and scraping the faces of both blocks with a sharp knife or chisel. The new gaskets are then coated with shellac on both sides and carefully put in place and set up tightly while still damp..

The cost of any gasketing is slight, and these should be replaced as soon as the slightest leak is in evidence. In this way one is amply repaid by securing better performance, a cleaner engine, without wasting oil, if leakage is from that source. All things considered the danger from fire is greatly lessened to the car itself as well as to the garage where it is stored.

TROUBLE IN STARTING MOTOR.

(J. C. P., Lawrence, Mass.)

I have trouble with the starter on my Paige model 36 Glenwood. I removed the starting motor and found gears in perfect condition and the trouble seems to be in the coaster gear. I removed the nut from the end of gear, thinking it would release the gear so that I could take it out and locate the trouble, but the gear still remains fast. There must be some other way of removing it. Will you kindly advise me on this, as I should very much like to be able to fix it and keep the car out of the repair shop.

As you do not state what your particular electrical trouble is we cannot help you.

The removal of the nut from the coaster gear should allow this to be taken off. From your description it is evidently stuck and a wooden block placed against it and striking a few sharp blows with a hammer will probably loosen it sufficiently to be removed.

HOW TO CARE FOR THE STORAGE BATTERY.

(Wm. G. Reed, Boston, Mass.)

Carefully read, study and obey the instructions found in the booklets issued by the manufacturers of your particular battery.

They include:

Inspections, once or twice a month. Better once a week; and if the car is used a great deal, every 200 or 300 miles.

Never put any but pure, distilled water in the solution.

There is very little, if any, danger of overcharging, but there is of overheating. Do not try to force an unwilling engine to go to work. If it is "balky" look for something wrong in gasoline feed or electric system.

The generator is nicely calculated to care for the lights, with a surplus for "recharging." What the lights would consume, together with that "surplus," is too powerful a current, if long continued on a hot day. At this season, when touring, one is often tempted to "hit her up" to 25 or 30 miles per hour. At such times turn on the lights. Same if in "second" or "first" on bad roads or long, steep grades. The motor speed is the real factor.

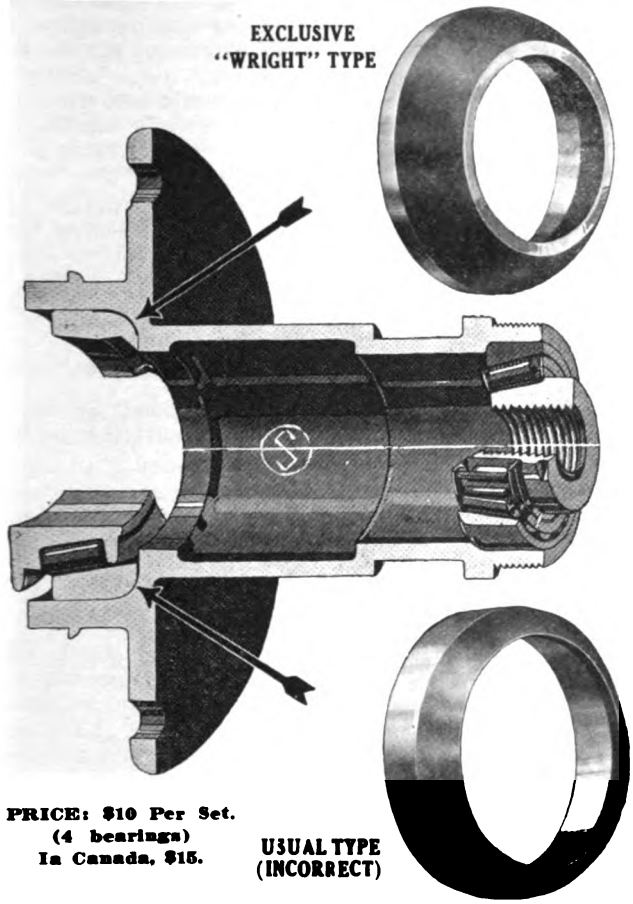
FORD MAIN BEARINGS.

(G. C., New York City, N. Y.)

Kindly state a way that I can repair one of the main bearings of my Ford car without removing the engine block from the chassis. The babbitt seems to be all right, but there is a little play in the bearing, enough to cause a knock. There are no shims between the cap and the bearing.

The main bearings on the Ford engine are poured into place and cannot be replaced without removing the whole block and sending it to a repair shop or service station. Whether a repair is possible or not depends upon the amount of babbitt metal left in the bearing. Remove the cap and place it in a vise. Then with a medium file scrape off a very small portion of the cap face, taking care to keep the face flat and even or the cap will not fit properly. After a little of the face has been removed try the cap into place and see if it can be tightened to take up the play in the bearing. After

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the cap has been filed enough so that it can be tightened enough to come up against the shaft, cover the journal with Prussian blue and scrape the babbitt if necessary until a good bearing surface is obtained. Be very careful in scraping not to remove too much of the metal or you will be unable to fit the bearing properly.

If the babbitt is very thin or badly worn the best plan will be to send the block with the crankshaft and bearings complete to a Ford service station and have all the main bearings replaced, for if one is worn the other two will probably need replacing in a short time.

PROPELLER SHAFT TROUBLE.

(A. A. F., East Orange, N. J.)

As a reader of the Automobile Journal I write to ask for some of the helpful advice which I know that you are giving to subscribers.

I have a Buick D 6-45 (1916). When I grasp the propeller shaft just behind the universal joint I find that I can revolve it back and forth, for perhaps a quarter of an inch or a trifle more. I presume that this play should be taken up. It is not clear to me just how this is done and whether it is a particularly difficult job to do, requiring an experienced man.

Will you please write me in detail regarding this. I have run the car 11,000 miles without having made this adjustment and I guess it's time to have it done. I expect to go on a tour in about three weeks and would appreciate early advice.

We suggest that you remove the drive shaft from the car, clean and make thorough adjustments as follows:

Loosen the cross pinch bolt at the rear of the torque tube. Remove pinion adjustment corner plate and expose the pinion adjustment. Mark with a file the exact point the drive shaft projects from the torque tube. Turn the pinion adjustment to the right until it is free, whereupon it may be drawn out at the rear.

Wash all parts thoroughly with gasoline, making sure that the gasoline is absolutely free from sediment and carefully examine all parts for wear.

Replace the drive shaft and screw the pinion adjustment back until the file mark on the drive shaft shows itself in its former position. The pinion adjustment is then the same as before. Replace the differential and bolt it into place. Any loose play in the driving yoke can then be removed by loosening the clamp screw at the end of the torque tube and turning up the nut until all end play is eliminated, whereupon the clamp screw is tightened and adjustments are complete.

KNOCK IN FORD CAR.

(E. G., N. Chelmsford, Mass.)

Will you kindly tell me what I can do to stop a knock in my engine. I put in all new piston rings, the top rings are leakless. Since their installation there is a knock in the engine. My car is a Ford. The connecting rod bearings are tight and the main bearings are O K. The knock seems to be in the front cylinder.

This condition may be due to any number of different troubles and to locate these a search much be made in a systematic manner.

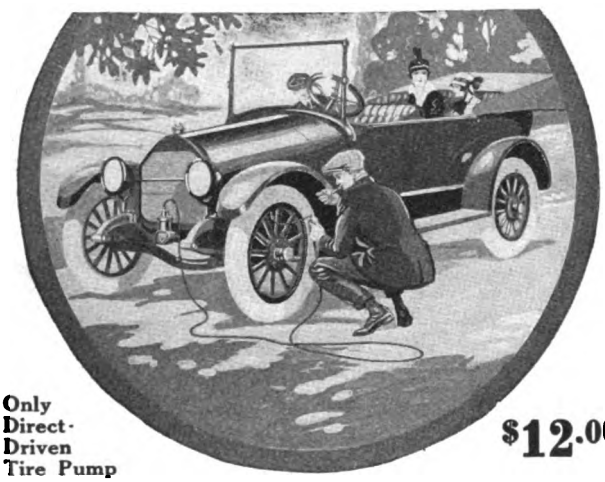
Knocking in the Ford engine is usually traced to
Carbon deposits on the piston heads.
Loose connecting rod bearings.
Loose crankshaft bearings.
The spark advanced too far.
The engine overheated.
Insufficient lubrication.

There are quite a number of possibilities for this condition in your car. First examine the gasket between cylinder head and block. We should advise a new one, covered with a paste of graphite and oil. Under ordinary conditions the leakage may not be noticeable, but high engine speeds or under pressure there may be a leakage of water into the cylinders. If the leak is large it would account for the knock.

Examine the valve setting carefully. Be sure that the clearance between the tappets or push rod is not more than 1/32 of an inch. The correct clearance should be about 3/32 of an inch when the engine is cold.

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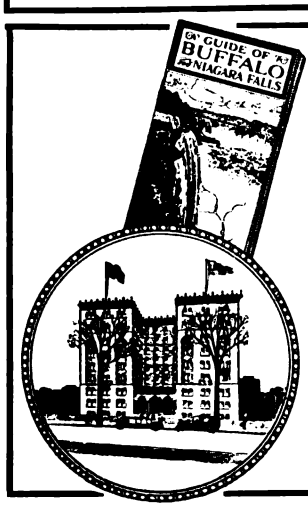
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H. GARDNER, Mgr.

Recently we were called upon to inspect a Ford which developed a peculiar knock and we found that the spark plug electrodes extended into the valve chamber so far as to interfere with the valves. In this case the engine action was very peculiar. Besides the knock there would sometimes be a skip, sometimes a backfire, due doubtless to the fact that the intake wedge opened. There was a noticeable lack of power. Inspect your engine for the same conditions.

Inspect the valve setting. See that the exhaust valve closes when the piston in that cylinder is at top centre. Check over the timing. It may be possible that the timing rod has been sprung or bent so as to retard the timer. With the spark fully retarded the coil should begin to buzz 1/16 of an inch from the top center.

Are you sure that the piston rings are tight? Is the compression good and the cylinders not scored?

If you are using any kind of water attachment on the carburetor, inspect it to be sure that it is not delivering too much water to the cylinders.

RENOVATING MOHAIR TOP.

(J. W. Mc., New York City.)

What is the proper treatment and best material for renovating a mohair auto top?

A mohair top should frequently be dusted and brushed. Mohair is not effected by climatic conditions and will withstand both heat and cold, and not having oil in its makeup does not pick up nor hold dust readily. The top can be lightly beaten with a carpet beater and what dust rises from inside the fabric can easily be brushed off with a whisk broom. In cleaning a mohair top do not use an acid solution. Grease or oil may be removed by the application of a solution of luke warm water and ivory soap applied with a woolen cloth. Any of the approved methods of cleaning cloth may be used to advantage upon this material. Gasoline or benzine have a tendency to spread instead of remove the dirt and for this reason is not to be recommended, although it works no apparent injury to the material.

For making quick and permanent repairs of holes and torn sections in the top, we suggest a self curing patch, which is sold in various shapes for 50 cents a box. These patches are a fine quality of mohair with a coating of uncurling gum on the under side. To use simply moisten the gum side of the patch, cover the hole and press firmly until the gum sets. This will make a neat and unnoticeable repair. The patches may be purchased at any accessory store.

Do not fold a top until it is thoroughly dry. Any moisture remaining in the folds is apt to cause mildew, besides making the top leaky and unsightly with spots. If the car is not to be used for some time it is best to open the top, thus keeping it well stretched and smooth.

KNOCK IN OLDSMOBILE ENGINE.

(A. L. H., Rochester, N. Y.)

Being confronted with queer engine troubles I have decided to write and explain them to you as perhaps you can offer some suggestions that would help.

I have an Oldsmobile model 43, 1916. Last fall we had trouble that could not be located. The engine would run sluggishly. Had the carburetor cleaned and overhauled and adjusted for both lean and rich mixtures. Wiring all gone over, but found no ignition nor carburetor trouble. Still the engine ran unevenly. I was told to have the engine overhauled, so had the valves ground; took up on the connecting rods; installed leak proof piston rings, one ring to each piston, and purchased a new storage battery, which at last seemed to remedy the skip trouble. This was done last November. Now I am troubled with a knock which seems to occur in each cylinder when I try to accelerate or in taking a grade in high gear. If I race the engine when the car is standing the knock seems to turn into a thump. After consulting a garage man he claimed that the connecting rods were loose and I instructed him to take them up again, but in so doing the trouble has not been overcome. This being twice that the rods have been tightened since November and

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I have driven not over 1000 miles. It seems to me that there is something wrong that should be attended to. It seems impossible to get anyone that understands the trouble.

To state exactly where the knock is on your engine is practically impossible without first seeing your car and the best we can do for you is to give you a general synopsis of causes of engine knocks and allow you to work from these instructions.

It is necessary first to learn at just what part of the engine the knock exists and just what the cause is likely to be. With this information to start from no parts need be removed other than those absolutely necessary. Taking down an engine is a costly operation and often much time could be saved if it were known just where the trouble occurs. A sounding rod of iron or steel will be invaluable to locate the knock and with it one usually gets to the seat of the trouble at once. After determining just where the knock is situated the trouble may be easily overcome.

Before you start to make tests upon the engine be sure that the knock is not due to minor causes such as:

That cylinders are filled with carbon and that the knock is caused by preignition.

That the knock is due to running with the spark too far advanced.

That the carburetor is not properly adjusted.

That the valve clearance is not correct.

Knocks are usually caused from: Connecting rod bearings, wrist pins, main crankshaft bearings, loose pistons, timing gears, camshaft, loose flywheel, worn valve stems or pistons striking some projecting point.

ADJUSTING CARBURETOR ON KING EIGHT.

(C. R. M., Providence, R. I.)

My King "8" car, 1917 model, is using too much gas. It has a Ball and Ball duplex carburetor. Would you please let me know just how to adjust it to best advantage.

I want to congratulate the Automobile Journal Publishing Co. for the journals they have put out in June and July. If one is mechanically inclined he cannot help but take his car apart and put it together again without any difficulty.

There are only two adjustments provided and found necessary on this style carburetor. These are made by means of covers which control the tension on the idling valve springs.

After the engine is warmed up and running from 400 to 500 revolutions, disconnect the wires from the spark plugs on one group of cylinders, and screw the cover controlling the air of opposite live group of cylinders up or down until this side of the engine idles properly. This being done, disconnect the wires from the spark plugs of these cylinders and connect the wires to the spark plugs of opposite group of cylinders, which can be made to also idle properly by the same adjustment.

When connecting all the wires to their respective plugs reduce the throttle openings and cut the speed as low as possible. The idling valves will need some further slight adjustment owing to eight cylinders now turning the flywheel, but against screwing each adjusting cover a notch or two to the lower position should usually suffice to produce the desired results on the entire unit.

The proper mixture for the various other speeds will be furnished automatically and can be changed only by changing the size of the nozzle.

WHAT TO DO IN CASE OF FIRE.

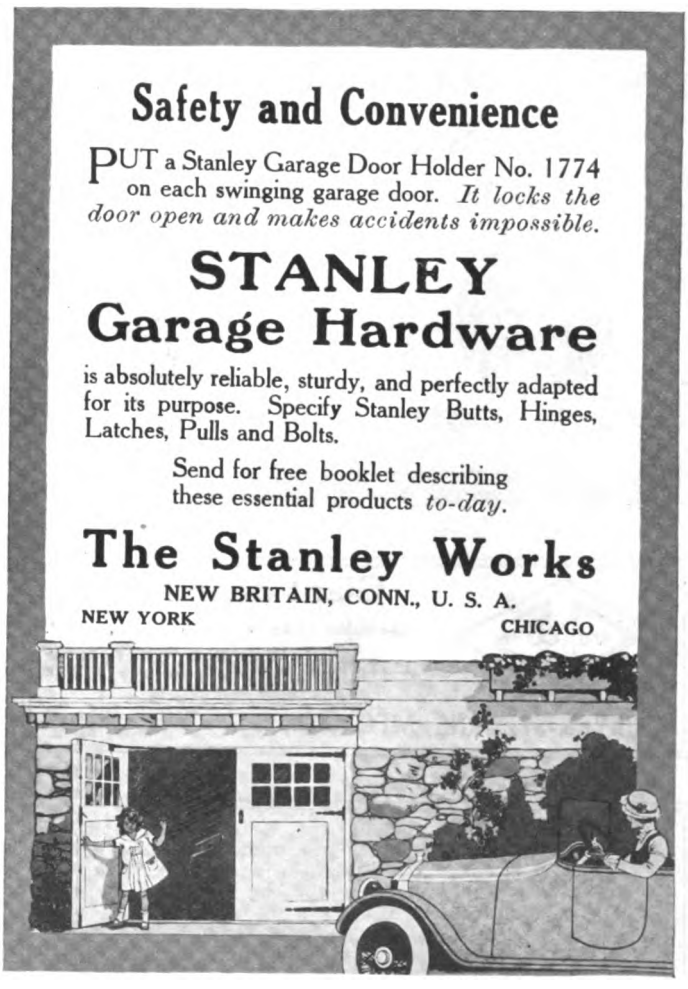
(G. H., Boston, Mass.)

Having seen several automobile fires lately, I have wondered what I should do in such a case. Could you advise me how to be prepared for such an emergency?

If one keeps their engine well cleaned and free from grease and oil a fire will not often occur, but unfortunately a fire starts when least expected and it is well to be prepared for such a condition.

The most important thing to remember is to keep your head. A few seconds lost in dashing wildly about thinking





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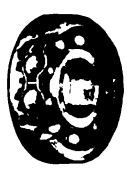
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what should be done and not doing it often results disastrously.

It is good policy to carry one small fire extinguisher in an accessible place about the car and an extinguisher of this sort is indispensable in handling a gasoline fire and in addition is always useful in fighting any other small blaze about the car. Should no extinguisher be at hand, either sand or dirt can be used, first remembering that if thrown into the carburetor mechanism much harm is liable to result. Water should not be used to extinguish a gasoline fire, as it will only tend to spread the blaze.

An extinguisher of which there are numerous types on the market is the best preventive for a fire and we strongly advise one as part of the accessories carried upon the car.

RIGHT TIRE WEARS FASTEST.

(G. F. C., New York City, N. Y.)

Please explain to me why the right tire seems to wear much faster than the others? I cannot understand this, as both of my car's brakes are equalized, nor does the right rear wheel wobble or run out of true.

Since the power and traction come from the rear wheels, the rear tires, of course, get the hardest wear. When one is driving on the right side of the road and the roads are nearly always crowned nowdays—the car is tilted slightly; more weight being on that side. Therefore, the rear right tire takes hold the hardest and bears the brunt of the traction much more than the left rear tire. When the car is in motion the left tire rolls easily along in the smooth middle portion of the road, while the right tire gets the rough going, continually running off the sharp edge of the asphalt into rocks and ruts and is much more likely to encounter objects thrown to the side of the road. Then also the rear right tire takes the brunt of the stopping, sometimes sliding, thus explaining why most of the wear falls upon the right rear tire.

The tire receiving the next hardest usage is the left rear, then the right front and lastly the left front. When the right rear begins to show wear it is best to put it on the left front wheel, changing about as often as neccessary, but first being sure that the tire runs in the same direction as formerly, not reversing the movement.

STARTING TROUBLE.

(C. R. C., Chicago, Ill.)

I own a 1915 model car that requires priming to start the engine if it has been standing overnight, and then stops after running a short time. The engine must be run until it is hot before it will take the load. The battery has been recently charged and it only lasted 10 days when it was completely discharged. Kindly advise me what the trouble is.

From the description that you give it would seem that the valves are not feeding properly and that the compression is not what it should be. This defect should be tested by turning the engine over with the hand crank and noting that the compression is equally good in each cylinder. Probably the valves need grinding or perhaps the piston rings are not tight and need replacing. In this case a leak proof ring should be installed in each cylinder. That your battery is run down denotes a short circuit or that you have left the switch on over night, in which case the starter is driving the engine. This type starter is a motor generator in which there is a constant connection between the starting motor and the engine and when running at very low speeds or when the motor is shut off with the switch on, the starting motor drives the engine and runs the battery. The wiring of your car should be carefully gone over for defects and worn places in the insulation.

SIMMS MAGNETO ADJUSTMENT.

(F. F. B., Providence, R. I.)

Please give me the proper adjustment for the platinum points in the Simm's magneto breaker box?

The platinum points should be set so as to open on each can about 1/64 of an inch, or the thickness of a business card. These points should be kept clean and made flush or flat with one another. If the points are separated on one side of the revolution more than the other, it is an indication that the contact breaker cam ring is worn and must be replaced by a new one.

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Firm name.....

Address .....

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Please send by express or parcel post paid.....quarts
" " for 10c. herewith one sample.

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Name .....

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.....

Send check or money order unless known to us.

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If you can't buy a set, at least buy one for a spare—you'll find that you will get a bigger mileage than is usual.

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32x3½	$6.50	35x4½	$10.00
31x4	$7.35	36x4	$10.00
32x4	$7.25	36x4½	$10.50
33x4½	$9.25	35x5	$12.50
33x4	$8.00	37x4½	$12.00

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TRADE MARK
TREADO
PATENTED MAY 9, 1916 REG. U.S. PAT. OFF

Save Money On Your Tires

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TREADO

adds thousands of miles to tires, it rebuilds worn treads, mends large and small cuts and can be applied by any one. **TREADO** is a prepared rubber Requires no cement, heat, patches or rubber.

Full directions on every can. Send today for a can at **50c.**

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AUTO SALVAGE CO., INC.

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Parts for any Automobile at a saving of 50% to 80%. Our three great plants cover every state in the Union, and we are therefore in better position to fill your orders.

Engines—40 to 50 of them on the floor now and we will make prices on them that will move them. Several unit power plants.

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Rear Axles—From the Timken to the Ford many with transmission on them, at prices from $10 to $75.

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Piston Ring Special Prices

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High-grade rings up to 5 inches, in dozen lots at, each.....25c.
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New Made-to-Order One-Man Tops

We make the low, graceful one-man top to fit any car. It can be easily put in place, as it fits the old top fittings.

5-passenger one-man Mohair top.$45.00
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These prices include the complete top, storm curtains, top dust-proof boot with special attachment for connecting top to any windshield.

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Complete set of two front and two rear absorbers with fittings ready to attach—for immediate delivery.

For Packard, Cadillac "8," Hudson Super-six and Haynes 1917 models, per set.....$25.00

We can make fittings for many other cars and make delivery in 10 days. It is necessary for us to have the model type and the rear, as well as the name of the car, in order to insure a perfect fit, per set.....$25.00

Extra Values in Casings and Tubes

These casings are factory seconds that will give excellent service. They do not have a mileage guarantee Both the casings and the tubes are good values and will go fast—better order early.

Casings

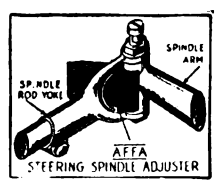
30x3	Smooth tread	$10.00
32x2½	Non-Skid	14.95
31x4	Non-Skid	20.00
33x4	Non-Skid	21.70
34x4	Non-Skid	21.95
30x3½	Non-Skid, Ford size	14.50

Tubes

30x3	Heavy grey tubes	$2.50
32x3½	Heavy grey tubes	3.85
31x4	Heavy grey tubes	4.65
33x4	Heavy grey tubes	4.90
34x4	Heavy grey tubes	5.15
30x3½	Red or grey tubes	3.00

PURITAN MACHINE COMPANY
108 Puritan Bldg., 415 Lafayette Blvd., Detroit, Michigan

AFFA
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The Spark and Throttle Rods
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They serve many other useful purposes and are inexpensive.

JOBBERS, DEALERS, write for prices and folder which mean money for you.

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Send 25 cents and dealer's name for a large can to

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Size	Price	Tubes	Size	Price	Tubes
30x3	$9.00	$2.30	34x4	$18.35	$3.65
30x3½	11.25	2.65	34x4½	23.25	4.45
31x3½	11.30	2.80	35x4½	24.00	4.55
32x3½	12.75	2.85	36x4½	24.50	4.80
34x3½	14.00	3.10	37x4½	25.00	5.00
31x4	17.00	3.35	35x5	27.25	5.60
32x4	17.20	3.45	37x5	28.75	6.00
33x4	18.00	3.50			

Non-Skids 10 Per Cent. Higher.
Mail Orders are accurately attended to. All C. O. D. Orders shipped with privilege of examination. If not satisfactory to be returned at our expense.

General Auto Tire Co.

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SAVE AT LEAST 50%

We have in stock at all times parts for Stearns, Stevens-Duryea, Flanders, Maxwells, E. M. F., Buicks, Mitchells, Speedwells, Herreshoffs, Hudsons, Elmores, Pope Hartfords and Franklin cars.

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Dealers write for our special proposition.

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All electrical apparatus bought, sold, repaired.

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HERBERT AUCOCK.
185 Columbus Ave., Boston, Mass.
Established in 1910.

SCREW MACHINE PRODUCTS

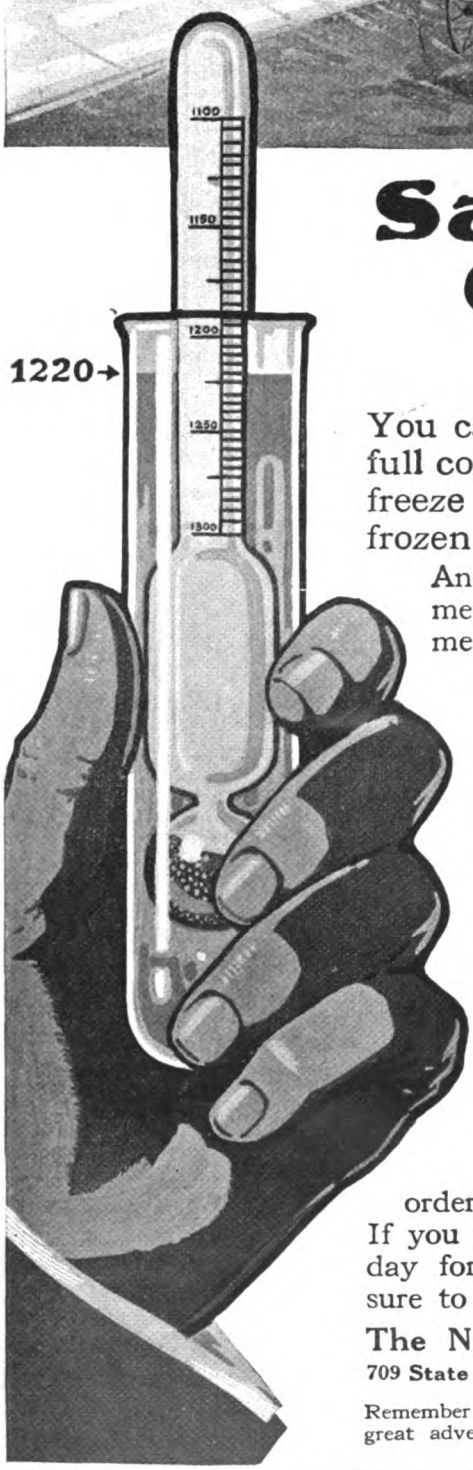
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You can sell Norwesco "TWELVE-TWENTY" in the full confidence that it represents the last word in non-freeze solutions. It is absolutely *safe* and *sure*—prevents frozen radiators to 20° below zero.

And the motorist *can test it* with an ordinary battery hydrometer—can *prove* that his radiator *is safe* from freezing. That means confidence in

NORWESCO TWELVE-TWENTY
PREVENTS FROZEN RADIATORS

And it means big sales for *you.*

"TWELVE-TWENTY" has none of the drawbacks of so many anti-freezing solutions. Does not "find" leaks. No complaints about evaporation—has a boiling point 12° higher than water. No mixing—no dissolving—pour it right out of the can into the radiator.

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If you are already handling "TWELVE-TWENTY," send us your name and address and your jobber's name so that all mail order inquiries can be forwarded to you. If you are not yet carrying it, write today for our Dealer's Proposition. Be sure to give your jobber's name.



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THE AUTOMOBILE JOURNAL

VOL. LXVI. PAWTUCKET, R. I., SEPTEMBER, 1918. NO. 2.

Urge Greater Care In Using Tires To Meet Needs of Conservation

Manufacturers State That Thousands of Shoes Are Thrown Away Prematurely That Should Run Out Their Full Mileage If Given Proper Attention and Treatment

THERE has been a moderate cut in the production of pneumatic tires for passenger car use and while there has been no request from the War Industries Board for restriction in their use, the large tire manufacturers are urging users to employ the various precautions that prolong the life of tires.

It is felt that this attitude on the part of every user of pneumatic tires will effect a saving of millions of dollars and of crude rubber that now goes into shoes and tubes that reach the junk man long before they have run their allotted mileage and given the length of service for which they are designed.

Practically every motorist is familiar with the numerous ways in which his tires and tubes are prematurely consumed, but in the past he has had no reason to worry, as he felt assured of a constant supply and was willing to pay out the extra money rather than exercise due caution in caring for his tires and in handling his car in a manner that would prolong their service. Such an attitude, however, is no longer patriotic, as every car user owes to his country, his fellow motorist and himself to see that he derives every possible mile from his shoes and tubes. This forehanded action will go a long way toward precluding any action that might possibly lead the government to require some conservation movement in the use of tires.

The most essential thing to keep in mind in this movement is the imperative necessity of giving immediate attention to any cuts, tears, bruises or perforations in the casings. Tires so injured should be immediately taken to a tire repair man or should receive the owner's prompt attention. There are a large number of people who neither have the time nor knowledge to enable them to care for their own tires, in which case they should seek the repairman, but there is almost every facility on the market to repair tires that can be secured by any one, a condition which permits of no excuse for neglect or unwarranted wastage of this product.

Probably the most flagrant misuse of tires and the one responsible for the greatest wastage is the careless method of driving cars employed by such a large majority of operators. The average driver does not realize that when his car is rolling along at 20 to 30 miles an hour that he has from a ton to two tons of dead weight in motion and the enormous amount of friction necessary to

GOING, GOING, GONE!

Story of the Neglected Tire Injury In Three Reels



Slight Tread Cut. Owner Thinks It Too Small for Attention of Repair Shop. Dirt, Water and Oil Get In, Starting Rapid Disintegration. Application of Tire Dough or Vulcanizer at This Stage Would Have Saved Casing and Tube.



Same Tire After a Run of 300 Miles, Showing Formation of Sand Pocket, Which Is Enlarging Rapidly. Structural Strength of Casing Weakened by Rotting Fabric. Not Too Late to Apply First Aid.



Too Late Now for First Aid. Several Hundred Miles Further Has Developed a Blowout and if Casing and Tube Are Not Ruined, Expensive Repair and Loss of Time Results.

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bring it to a stop. He applies the brakes and knows that the pressure is exerted against the brake drums, but never recognizes the fact that the actual friction which brought the car to a slower pace or to a dead stop was generated between the tire tread and road. The abrasive effect of the average road surface is equal to that almost of coarse sand paper and as an illustration of its effect one would have to drag a tire supporting a weight of over a ton across an abrasive surface, the former and latter being in relatively fixed positions.

Use of Judgment in Driving Will Save Many Tire Bills.

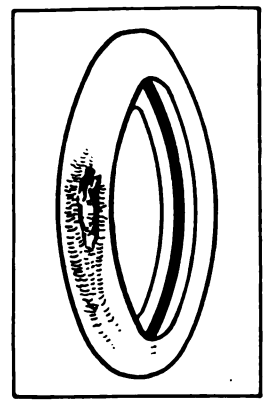
There is but one remedy for this chief cause of tire destruction and that is the employment of judgment in controlling the car. If the operator, instead of continuing to within a few feet of his stopping point at a high speed and then suddenly applying the brakes, would shut off his power at a proper distance from the stopping point so that the car would be brought to a standstill through exhausting its momentum, there would be little if any abrasive action exerted on his tires through friction between the tread and road surface.

Many car owners are acquainted with these facts, but in the past when they were called to their attention they usually rejoined that life was too short for such extraordinary care and that they could afford new tires when necessary. This spirit, however, will not do under existing conditions and is no more excusable in a man who can afford new tires every day if desired than in the man who is doing it out of ignorance.

That the wheels of a car are in perfect alignment is another important feature in considering tire conservation, as wobbly wheels are a source of almost as great tire destruction as the careless driver. The prevalence of this type of neglect is alarming if one will take the time to post himself at a crossing where numerous cars pass, as he will be astounded at the number of machines running on wheels that wobble along from side to side, giving the same destructive action on the treads that would be secured by constantly drawing a piece of sandpaper across them from side to side with a pressure equal to that which could be exerted by 10 men. In calling attention to this deplorable neglect the Goodyear Tire and Rubber Co. in one of its conservation bulletins states that a tire is built to roll forward in a straight line—not sideways in a twisting motion, and that a tire running on a wheel that is out of alignment cannot possibly give good service. Frequently the mileage is cut down one half because the tread is ground away long before the casing has delivered its full quota of mileage, and, of course, the extent of the loss of mileage depends directly on the degree of misalignment.

Wobbly Wheels a Frequent Cause of Rapid Tread Wear.

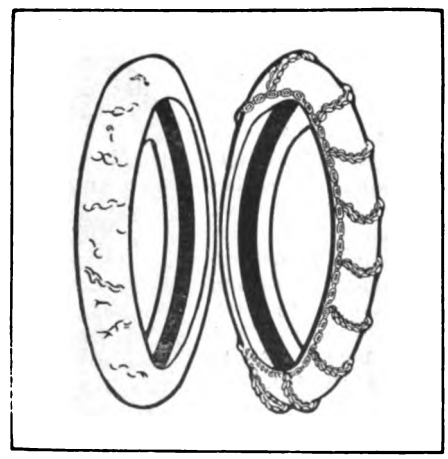
As the driver never sees his wheels while they are running, he is not aware of their condition unless some one tells him about it and he immediately decides that his tires are of a poor quality when he discovers that the treads show abnormally rapid wear. There is only one sure way of avoiding this loss in tire service and that is to have the wheels measured frequently to see if the



Showing Long, Deep Laceration, the Ruinous Effect of "Heavy" Braking on Tread.

alignment is correct as many minor causes are responsible at times for throwing them out and a demountable rim placed crookedly will also cause excessive wear on the tire tread.

Before considering the wear on shoes and tubes from actual service there is another important point in tire conservation that is neglected by the average car operator, namely, the improper use of chains. Non-skid chains are used by most everybody in wet weather and when the roads are slippery or covered with sleet and snow and while they are the only known contrivance that has so far been brought out which actually serves to give the wheels positive traction under such conditions, they inflict



At Left: Chain Cut Tire Caused by Tight Chains. At Right: Properly Hung Chains.

considerable injury to the treads when running over hard pavements or hard roads. They are designed for use on soft, muddy or slushy roads, where it is difficult to obtain traction and where the chain sections sink into the surface of the highway and do not sink into the tire tread as they do on very hard surfaced roads.

As it is a bother, however, to constantly keep changing the chains the user should take care in applying them so that they will have enough play to work around the wheel, which arrangement prevents the individual links from keeping a fixed position and gradually working into and cutting holes in the tire. In the winter time one can frequently see tires which have been cut clear to the tread wherever the chains cross the tread, a wanton and useless waste that has resulted from the negligence of the driver to apply the chains properly or remove them whenever their use is no longer required.

Chains Should Never Be Anchored or Put on Tightly.

Chains should never be "anchored" or held in fixed positions by tieing them to the spokes or rim, but should be allowed to "float" as the wheel revolves and as when applied in the former manner they wear the treads when the car is being run over a hard surface, their use should be confined to road conditions calling for means of preventing the car's tendency to skid and to obtain traction. Should owners find that their chains have cut into the treads or that they have raised bruises, the tires should be immediately removed and repaired before the damage has extended to a point where the casing is not even fit for retreading.

In changing tires and replacing them, aside from the precaution of properly placing the tube in the casing and getting the valve straight so that it will not work or tear the tube, it should be remembered that once tires have been run a few hundred miles they have acquired a "sense of direction," or the condition might be described as a "direction of flow." This results from the fact that after a tire has been on a wheel for some time it is affected by the direction in which it has been run, and being constructed of highly flexible and elastic material, it shapes itself to run in one direction, as the pressure on its fabric, strips and tread is exerted in one direction; it stretches in that direction; strains in that direction; recedes before a blow in that direction and while it recovers its normal shape to all outward appearances, it has a tendency to set in the direction where forced and does so to a certain extent. For this reason when it is removed it should be marked with an arrow indicating the direction in which it has been run and should be replaced so that it will turn as before.

This fact is probably known by but few motorists with the result that the majority in replacing their tires put them back on so that they reverse their original direction with the result that very rapid wear follows, as the same effect upon the structural strength of the casing is obtained as if the casing were put on a stationary mandrel and kneaded with a roller in alternate directions until the tread loosened from the fabric.

Transposing the Tires from Rear to Front Lengthens Service.

It has become a common practise among motorists to transpose the rear tires to the front wheels as a means of getting greater service. The greatest burden and strain is borne by the rear

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tires and they wear much more rapidly and after they have been repaired several times it is good policy to place them on the front wheels and put new ones on the back. In making this transposition it should also be remembered that a rear right tire should be placed on the left front wheel and the rear left shoe on the right front, as in this change the sides of the tires that were formerly on the outside and exposed to the greatest wear will be on the inside and will not suffer further from contact with curbings and other injurious obstacles to which the outside facing is always subject. This method of transposition also keeps the tires revolving in the same direction as when used on the rear wheels.

Proper Inflation Essential in Tire Preservation.

Over 75 per cent. of tire wastage, according to the pneumatic tire engineers. comes from the failure of the motorist to observe the rules for tire inflation. The proper pressure in a tire varies according to the size of the casing and the load to be carried, a table of these pressures giving the pounds per square inch being shown on this page.

To follow out this formula for inflation it is of course necessary to know the approximate weight of the load on each wheel, which can be determined by weighing the car with its full load of passengers, water, gasoline and whatever accessories and equipment are to be carried. After the total weight is determined run the car on the scales as far as the middle of the running board, which would be the approximate centre, and get the weight of the front of the car. Do the same with the back and if the car is backed on to the same point in the centre as was used in weighing the front, the total should be within a few pounds of the weight of the whole car as determined at first and, of course, half of the front or rear weight would give the weight carried by each of the wheels on the front or rear axles respectively.

Methods of Determining the Right Pressures.

There are also standard methods employed by engineers through which the essential inflation pressure can be determined to a degree of certainty.

The manufacturer fixes a maximum pressure for inflation, which is determined very carefully. There is a limitation to the load that can be carried on a given tire. The side walls of the tire will flex under load and it will become flattened. If the width of the tire under the wheel exceeds by 10 per cent. the width of the tire on top of the wheel the load is greater than can be carried in safety, that is, with regard to the endurance of the shoe. By this is meant that if a tire has a cross section diameter of 3½ inches and it measures under a given load where it contacts with the road not more than 3 27/32 inches, it is not loaded beyond the limit of safety. but if it measures 3 28/32 it is too heavily loaded. In such an event there would be two courses open, the one to increase the inflation pressure until the cross section measured less than 3 28/32 inches, or to reduce the load until the same result were obtained. But if the maximum inflation pressure has been reached there is no alternative than to lessen the load upon the tire until the width of the cross section carrying the weight is 3 27/32 inches.

All tire engineers agree that the load carried by a shoe inflated to the maximum should not increase the width of the cross section carrying the load more than 10 per cent. The figures quoted in the illustration are the nearest that can be given in inches without the use of decimals. Obviously the exact measurement would be .35 inch, and 11/32 inch, which has been stated as the limit, is .34275 inch, which is approximately correct. Innumerable tests and experiments have proven that this 10 per cent. increase of width of tire cross section is the maximum. If this width is exceeded the side walls may be rim cut and there is strong probability that the fabric, which is impregnated with rubber and held by the compound covering it, will be broken. These results will follow in any event a continued use of the tire that is overloaded.

Carrying Capacities and Air Pressures of Pneumatic Tires

	Air Pressure	Rear	Front
28x3	in. 50 lbs.	350 lbs.	450 lbs.
30x3	in. 50 lbs.	375 lbs.	475 lbs.
32x3	in. 50 lbs.	375 lbs.	475 lbs.
34x3	in. 50 lbs.	400 lbs.	500 lbs.
36x3	in. 50 lbs.	425 lbs.	525 lbs.
29x3½	in. 60 lbs.	450 lbs.	550 lbs.
30x3½	in. 60 lbs.	475 lbs.	575 lbs.
31x3½	in. 60 lbs.	500 lbs.	600 lbs.
32x3½	in. 60 lbs.	525 lbs.	625 lbs.
34x3½	in. 60 lbs.	575 lbs.	675 lbs.
36x3½	in. 60 lbs.	625 lbs.	700 lbs.
30x4	in. 70 lbs.	550 lbs.	700 lbs.
31x4	in. 70 lbs.	575 lbs.	725 lbs.
32x4	in. 70 lbs.	600 lbs.	750 lbs.
33x3	in. 70 lbs.	625 lbs.	775 lbs.
34x4	in. 70 lbs.	650 lbs.	800 lbs.
35x4	in. 70 lbs.	675 lbs.	825 lbs.
36x4	in. 70 lbs.	700 lbs.	850 lbs.
37x4	in. 70 lbs.	725 lbs.	875 lbs.
38x4	in. 70 lbs.	750 lbs.	900 lbs.
40x4	in. 70 lbs.	800 lbs.	950 lbs.
42x4	in. 70 lbs.	850 lbs.	1000 lbs.
32x4½	in. 80 lbs.	800 lbs.	1000 lbs.
33x4½	in. 80 lbs.	850 lbs.	1050 lbs.
34x4½	in. 80 lbs.	900 lbs.	1100 lbs.
35x4½	in. 80 lbs.	950 lbs.	1150 lbs.
36x4½	in. 80 lbs.	1000 lbs.	1200 lbs.
37x4½	in. 80 lbs.	1050 lbs.	1250 lbs.
38x4½	in. 80 lbs.	1100 lbs.	1300 lbs.
40x4½	in. 80 lbs.	1200 lbs.	1400 lbs.
42x4½	in. 80 lbs.	1300 lbs.	1500 lbs.
33x5	in. 90 lbs.	950 lbs.	1200 lbs.
34x5	in. 90 lbs.	1000 lbs.	1250 lbs.
35x5	in. 90 lbs.	1050 lbs.	1300 lbs.
36x5	in. 90 lbs.	1100 lbs.	1350 lbs.
37x5	in. 90 lbs.	1150 lbs.	1400 lbs.
38x5	in. 90 lbs.	1200 lbs.	1450 lbs.
39x5	in. 90 lbs.	1250 lbs.	1500 lbs.
41x5	in. 90 lbs.	1350 lbs.	1600 lbs.
43x5	in. 90 lbs.	1450 lbs.	1700 lbs.
36x5½	in. 95 lbs.	1250 lbs.	1500 lbs.
37x5½	in. 95 lbs.	1300 lbs.	1550 lbs.
38x5½	in. 95 lbs.	1350 lbs.	1600 lbs.
40x5½	in. 95 lbs.	1450 lbs.	1700 lbs.
37x6	in. 100 lbs.	1350 lbs.	1600 lbs.
39x6	in. 100 lbs.	1450 lbs.	1700 lbs.
41x6	in. 100 lbs.	1550 lbs.	1800 lbs.

While the tire structure as a whole will yield and flex when inflated to maximum, it is protected by the air content which prevents the side walls bending so sharply that the fabric will break. A 30 by three-inch tire will have an air content of about 400 cubic inches, a 30 by 3½-inch tire 545 cubic inches, a 34 by four-inch tire 745 cubic inches, a 36 by 4½-inch tire 1000 cubic inches and a 38 by 5½-inch tire 1640 cubic inches. This statement is made to show that the cubic inch air content increases very rapidly with the increase of the tire size.

Use of Oversize Shoes Gives Better Cushioning Effect.

The resiliency of the tire depends directly upon the air content, upon the inflation pressure, and upon the thickness and consistency of the carcass and the tread material. As the air pressure is equal upon all parts of the tire walls it is increased or decreased as the load is varied. The lower the inflation pressure upon the tire, so long as the width carrying the load does not exceed 10 per cent. of the normal width of the cross section, the greater will be the margin of safety. By this is meant that if a maximum inflation pressure is fixed at 80 pounds, and this can be reduced to 55 pounds and the cross section carrying the load not exceed by 10 per cent. the normal width of the tire, the vehicle will ride easier and there will be a very material reduction of the stresses upon the shoe. The greater the inflation pressure the more the resiliency is reduced.

Emphasis may be made upon the use of oversize tires, or shoes that will not be loaded to capacity. These will have excess resiliency because they are not inflated to maximum, and they will endure longer because they are stronger structurally. So long as they are used with sufficient air pressure that the static load upon them will not compress the cross section contacting with the surface so that the width is more than 10 per cent. of the normal diameter there can be no danger of damage from rim cutting or breaking of the fabric of the side walls. In other words, the tire that is not loaded to its capacity can be used with reduced air pressure, and the standard by which either load or inflation can be determined is measurement of the cross section. This may be made with a caliper or a rule having a fixed jaw about four inches length at one end and a sliding jaw, the reading being made between the jaws in inches or by simple marks that will indicate the normal width of the cross section of the tires of a vehicle and the maximum of 10 per cent. additional.

The reason that tires are frequently overloaded is that the manufacturers of

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vehicles will equip them with shoes that will just carry the estimated load, because larger tires will cost more, and when the equipment is increased, which is very frequently the case, or more passengers than there are seats for are carried, the total weight is excessive. If the tires are driven with reduced pressure the side walls of the tires are excessively flexed. One should remember the tire has very narrow limits of cubic inches air content if it will just safely carry the rated load, and deflation is extremely probable. For this reason frequent examination, preferably with a jawed slide rule, or with a pressure gauge, is not only desirable, but necessary if the owner wants to obtain practical tire conomies.

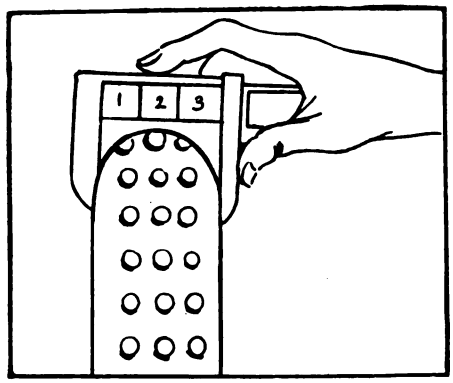
Load and Tire Size Regarded in Determining Pressures.

Regardless, however, of what rule a man is to go by in determining the proper pressure for his tires, the load should be regarded as well as the size of the tire, as is provided for in the scale shown. In any event it should be remembered that underinflation is the most ruinous factor in tire wear, as flattened tires permit of constant distortion in the tire fabric throughout and tends to generate heat which vulcanizes the rubber in the walls with the ultimate result that the component parts are separated and cracks develop so that structural weakness develops. The tire soon plays out in this condition and is not worth repairing.

Persons who run their cars on tires with low inflation pressure to secure better cushioning effects do so at a very great expense, as instead of paying for the mileage that they do not get out of their tires on account of thus abusing them, it would be more practical and cheaper to install oversizes all around. Oversize tires give a larger air cushion and, therefore, do not have to be inflated to as high a pressure as the standard size to carry the same weight and while the first cost is of course greater, the ultimate cost would not be as great as in the case of using regular sizes and running them without proper inflation.

Every motorist for this reason should carry a tire air gauge in his kit so that he can tell at any time what the pressure is in each tire. This precaution will work considerable good in the tire conservation movement, but it must be admitted—and it is a regrettable admission—that many motorists after determining the pressure in their tires would take no further action even if it were found that the inflation was insufficient, unless they were close to a garage where an available supply of tire air under pressure was available. For this reason those who have a marked adversion to using the hand pump or those too feeble to do so, should immediately provide themselves with a power driven pump, of which there are many types and styles on the market, and that require little effort to put in operation except the trouble of fitting the air tube nipple to the tire valve and turning a switch.

Thousands of motorists evidently labor under the illusion that their spare tires when strapped on the back are not suffering any deterioration or wear as long as they are not fitted to the wheels. Every tire placed in an exposed position on a car and kept for use in case of a blow out should have a durable case or covering to protect it against the light

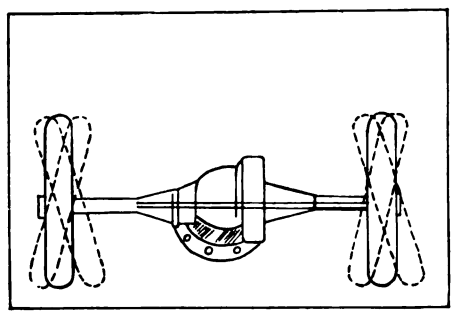


Showing Method of Applying Slide Rule in Gauging Inflation.

and heat of the sun, two elements which have a marked and deleterious effect on the composition that is used in tire manufacture and which will in time so harden it that cracks will start under comparatively light strain or use. This advice should also be followed with used tires that are being carried as spare.

It will become understood by every motorist after he has considered the various factors in the situation, that much of the economy in tire consumption can be put into effect long before it ever becomes necessary to take the tires to the repair shop and that he should give immediate attention to every small cut or bruise that he discovers on his shoes in order to remedy the damage before it becomes extensive, as a wound in a tire casing is much like a hole in a dike; small at first, but if not stopped up, becomes enlarged very rapidly. This "stitch-in-time" principle alone, if followed by every motorist would save millions of dollars worth of tires that go to the junk heap prematurely.

The urgency of this action in the con-



Wobbling and Twisting Motion of Wheels on Sprung Spindles or Loose Bearings Wear Treads.

servation movement was recently brought to the attention of the subscribers in the account of a test recently held by a tire manufacturer in which nine tires were run under similar conditions until they failed to give further service. The average life of the tires was 6500 miles. Two averaged 9500 miles each and the remaining seven covered an average of a little over 5000 miles each. Everyone of the seven blew out within 1200 miles after being cut slightly by sharp stones or glass, so that the fabric was exposed to the action of the sand and water while the first two tires ran until they were actually worn out, as would the other seven had they been given proper care and the little cuts and bruises been vulcanized in time.

Small holes in the outer rubber casing start most of the troubles that motorists experience with tires, as through these holes the casing is exposed, to start sand blisters and to water and dirt that rots the fabric.

There are vulcanizers on the market which can be used for vulcanizing small cuts and bruises on tires without removing the latter from the wheel. These can also be used for repairing tubes and as they take up very little room should be found in every motorist's kit if he intends to do his share in the conservation of tire products as well as labor. It should be remembered that vulcanizing practically restores an injured part of a casing or tube to a condition as good for all practical purposes as when it was first purchased and if this type of repair is made in every case immediately after a bruise, cut or puncture is discovered, the car owner can expect to secure 100 per cent. service from his tires.

Tire manufacturers are also calling the attention of motorists to the fact that there are too many tires being thrown away or sold to the junk men before they are broken down for good. In fact one company recently stated in a publicity announcement in connection with the conservation campaign, that few tires were completely worn out when thrown away and that most of them were capable of considerable extra mileage if given a little help. A rim cut patch or an inside tire protector in many cases where the carcass is cut and weak will give several hundred additional miles of service to the tire. Tires that seem hopelessly cut and broken can often be restored to use in this way. These rim cut patches are applied on the inside of the tire and have flaps which fit underneath the bead of the tire on both sides as a means of holding the patch in place.

Inside tire protectors provide a complete reinforcement for the entire casing of a worn and weakened tire and make it serviceable for from 500 to 1000 miles of travel. There are numerous other things that can be found in an accessory dealer's store that help in giving first aid to an injured tire or which will enable one to put the discarded shoe back on the wheel and make it give service for a month or two longer.

A number of tire fillers are now on the market which can be used in casings that have little left but the fabric. These fillers are also used by thousands of motorists as a means of avoiding punctures; the use of inner tubes or spare rims, as they will outlast any casing. Some manufacturers report instances where users have secured from 10,000 to 20,000 miles from a shoe used with the filler.

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ECCOLENE STIMULATES AND TEMPERS GASOLINE TO ADVANTAGE.

All products have a greater value when they are hard to get. The water is always missed most after the well has gone dry. Gasoline or motor fuels, and the latter is a better name nowadays for the material which is furnished, have not gone dry, but they are of very much lower grade, and are not usually as efficiently used as was the old 76 degree gasoline in the early days. Yet as a matter of fact the present lower or heavier grades of motor fuel oils contain more heat units and consequently more power than did the 76 degree gasoline. The trouble in the past has been that motorists have not been able to properly use the heavy fuel so as to make use of these added heat units. This is shown conclusively by the carbon deposits in the fire chamber, and on spark plugs, choked mufflers and motor fuel liberally mixed with the oil in the crank case. This motor oil in the crank case thins out the lubricating oil and makes it much less efficient. It is now necessary to drain the crank case every few hundred miles instead of using the oil for a thousand miles or more, as was once the case. Carbon deposits in the fire chamber cause the motor to knock or pound. Should this carbon get sufficiently hot it will cause a poor ignition and overheating of the motor. Carbon on the spark plugs short circuits the plug. The choked muffler delays the exhaust gasses from escaping, and so causes back pressure that might effect the prompt closing of the exhaust valve. This would result in the loss of motor power and added waste of fuel. A method of correcting all these evils has been recently made known, and it is now possible to use the lower or heaviest motor fuels without the great waste and without motor trouble. Eccolene properly mixed with the motor fuel will make it possible to so improve this firing mixture that the heavy ends of the motor fuel are efficiently consumed, and so consumed that they add power to the motor instead of causing carbon deposits in the fire chamber and on spark plugs, and condensation, causing the mixing with the lubricating oil in the crank case. Ralph De Palma, the speedy champion; Louis Chevrolet, Ralph Mulford and many other stars of the racing world, and many business firms and factories are today using this material and have testified to its qualities and its ability to perform the apparent miracles claimed.

Distributed by Edward A. Cassidy Co., New York City.

SEWELL CUSHION WHEEL CO. DECLARES 7 PER CENT. DIVIDEND.

At a recent meeting of the directors of the Sewell Cushion Wheel Co. a seven per cent. cash dividend was declared on both the common and preferred stock.

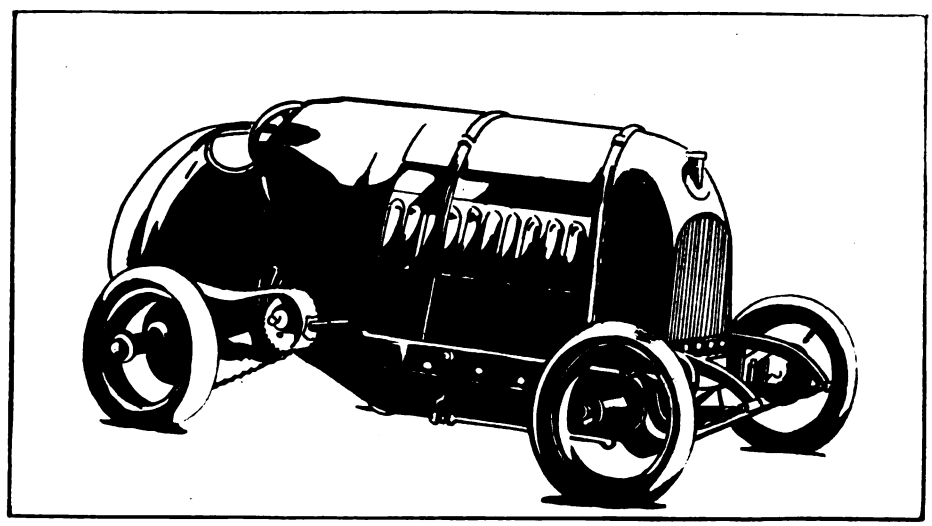
The Largest and Most Powerful Car Ever Used Successfully on the Road

The outbreak of the war in 1914 upset European car manufacturers so that their plans for developing new racing creations were suspended, although many surprises were in store for the racing fans at that time.

The Fiat company of Turin, Italy, which had always figured conspicuously in the racing field in Europe, as well as this country, had been experimenting with heavy high powered cars in 1912-13, and had placed on the tracks an extraordinarily large and heavy car, which was known as "Mephistopheles," having cylinder dimensions of 190x160 mm. (18,145.9 c. c.) This machine was generally supposed to be the largest car for power and weight ever built, although the company subsequently built a larger one in an attempt to secure the world's flying kilometer record. This latter car was to have been raced on the Brooklands track by the famous Italian pilot, Nazzaro, who tried it out over Italian roads first. Before the time came for taking the car to England Nazzaro started his own automobile factory and the big Fiat was turned over to Bordino, another Italian pilot. Bordino took it to Brooklands, but did not develop the speed that had been anticipated owing to the huge size of the car and difficulty of making the turns.

There was very little known about the actual capacity of this car, although it was built nearly seven years ago and most of the time since then has been in storage at the Fiat factory in Turin. A recent communication, however, from the factory to the Autocar of London revealed a number of the mechanical specifications, which prove that the racer is the largest car ever built as regards engine capacity. The engine has four cylinders, which are cast en bloc, with enclosed overhead valves. The cylinders have a bore of 190 mm. and stroke of 250 mm., or approximately 7 7/16 inches and 9⅞ inches respectively, with a piston displacement of 28,352.9 c. c., which is approximately 1730 cubic inches. It was rated at 300 horsepower.

The overhead valves and long stroke necessarily made it a very high engine, and while there was no extra space provided in the tall hood for the sake of appearance, it stood five feet, seven inches from the ground.



The Fiat 300 Horsepower Racing Car Which Has a Total Piston Displacement of 1730 Inches.

PROPER CYLINDER LUBRICATION.

The perfect lubricant for gas engines should either be consumed entirely in the cylinder or not at all. An eminent authority on gas engine cylinder lubrication afer many experiments found that the lubricant that was not consumed at all retained its full lubricating value as long as it remained in the cylinder. On the other hand the lubricant that is only partially consumed leaves a carbon deposit, while the lubricant that is entirely consumed leaves the cylinder dry.

Flake Motor Graphite meets the requirements fully because the intense heat encountered in the cylinder has no disintegrating effect whatever on graphite. There are a number of devices that are made for feeding motor graphite to engine cylinders.

GENERAL MOTORS INCREASES CAPITAL STOCK TO $300,000,000.

The stockholders of the General Motors Corp. at a special meeting held in Wilmington, Del., voted to increase the capital stock from $200,000,000 to $300,000,000. The increase in the capitalization raises the preferred stock from $50,000,000 to $100,000,000 and the common stock from $150,000,000 to $200,000,000.

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Manufacturers and Jobbers of Accessories Explain the Situation As It Affects Their Business

Committee of National Association of Automobile Accessory Jobbers Hold Conference With War Industries Board Representatives and Present Brief of Conditions in the Industry for Government Consideration—Organization Abandons Plans For Fall Exposition

THE show committee of the National Association of Automobile Accessory Jobbers has announced that plans for the first exhibition of accessories to have been held under the auspices of the organization at Chicago during the week of Oct. 28 to Nov. 2, at Medinah Temple, have been abandoned in deference to the wishes of the government.

"In consequence of the war conditions your committee having carefully reviewed the situation, studied it from various angles and considering the further fact that by direction of the board of directors a committee has just visited Washington for the purpose of ascertaining to what extent the manufacturers may secure raw material and what the jobbers' course will be in disposing of his goods, and while in Washington the committee conferred with Mr. Redfield, secretary of commerce, and among other things sought his views as to the wisdom of carrying on the exhibit," states the announcement.

Secretary Redfield's advice was:

"Go slow with your exhibit. In this terrible war we are in it will require every ounce of ammunition, every bit of energy, every available man, every dollar we can spare to win," and taking all of this into consideration we feel that there is no place for an exhibit or show at this time. On the contrary, we are of the one opinion that anything in the nature of an exhibit or show should be absolutely discountenanced and discouraged during the war period.

Brief Submitted to War Industries Board by Committee.

In the same bulletin in which the announcement was made to members, the report of the committee that conferred with officials at Washington was published, including the statement made by Commissioner William W. Webster of the N. A. A. A. J., who was chairman. This committee conferred with Rhodes H. Baker of the Priorities Committee, and Mr. C. C. Hanch, director of the Automotive Products Section of the War Industries Board. In the brief on behalf of the organization which was presented by Commissioner Webster, he explained the character of the business in which the members were engaged in; the extent of its scope and the enormous number of customers that were dependent upon it for parts, supplies, equipment.

His statement in part was as follows:

"This committee represents practically every large manufacturer and dealer in automotive equipment in the United States, as follows:

Jobbers.....212 members
Manufacturers.....230 members

"By way of explanation would state that the business of our members is practically all with cars that are in use. Once a machine is put into use it automatically comes into the branch of the industry which we represent.

Manufacturers Market Most of Their Product Through Jobbers.

"This committee has made a survey of the industry and find there are 118 jobbers outside of our membership. It is our business to familiarize ourselves with and know the conditions surrounding our line of business and those who are engaged in it either in a manufacturing or a jobbing way.

"The associate members of our association (manufacturers) market the larger portion of their product through the automobile jobbers (members of this association), as well as to non-members who are jobbers.

"Having thus explained the nature of our business we now appeal to you for some ruling that will clearly define what in your judgment you may consider essential and non-essential lines of this industry that may be privileged to purchase these goods in order that manufacturers and wholesale dealers in the line may know to whom they may or may not supply the replacement parts.

"We wish to point out in placing this matter before your board that we do not seek this information for the purpose of exploiting business generally in the commercial sense of the term, but rather for the express purpose of keeping a free flow of replacement materials for the great number of automobiles engaged in purely war and commercial activities contributing thereto, and it is our sole purpose and disposition to do only those things that are in keeping with your desires and that will render the best service to our government, and we stand ready and willing to cooperate with you in all possible ways, but we point out that in the absence of any specific ruling or authentic information as for whom we may or may not fill such orders, outside of purely war purposes or who may be considered by you as essential, we naturally appeal to you for this information * * *

"In order to acquire all information and of the latest date we have just recently solicited and received several hundred replies to letters that were sent out to our members, both manufacturers and jobbers, and from whom we sought advice and information simply in a preliminary way in order that we might have it to present their viewpoints to you for consideration and in the thought that it may be of some assistance to you in telling us what we desire to know. Some of these were from very large firms, others fair sized, and some small institutions who are scattered all over the United States from the Atlantic to the Pacific and from the Gulf to the Canadian border.

"A large number of these replies have stated that on their present understanding they cannot conscientiously sign the pledges generally presented to them or required for them in receiving stock, for they know of no guide at the present time that would fairly and conscientiously permit them to dispense with or dispose of such goods as the manufacturers may supply to the jobber or the jobber to his trade in the ordinary course of business. Furthermore, it is obvious the manufacturer must be supplied with raw material in advance of the orders received or remand placed upon him so that he may have an opportunity, especially with the present scarcity of labor, to properly execute same and have them ready when orders are received. Again another question that confronts the jobber is in receiving such goods he places them in stock not knowing at that time through what channels they may be disposed of, and

Very Light Stocks in Hands of Makers and Jobbers.

in the present frame of mind and feeling of the jobbers as explained above, it inclines us to the belief that even now in many cases replacement parts that are actually and urgently needed for war or commercial purposes or for matters in-

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cident thereto are being withheld or denied, which may tend in a way to defeat rather than to serve the very purpose of your own wishes and ideas and thereby harm done, though innocently as it may be, for reasons stated here.

* * *

"We wish to further point out that the impression has prevailed, at least in some quarters, that both manufacturers and jobbers have large stocks on hand and our information through these various letters referred to above indicate that some have only 30 days supply, but none have advised that they have over 90 days supply and both manufacturers and jobbers have advised that they are experiencing great trouble even now in getting their raw materials or finished products."

After citing instances where manufacturers of truck parts were unable to supply large orders through lack of raw materials and the crying need of the times for greater transportation facilities that must be met by truck haulage, Commissioner Webster pointed out the essential need of a plentiful supply of parts to keep those commercial vehicles now in use in service.

Essentiality of Necessary Replacement Parts and Stocks.

Referring to this situation the statement continues:

"And we now wish to point out the essentiality of necessary replacement parts and stocks of repairs for all of the foregoing and it is obvious that these stocks should be generally distributed in all parts of the country so as to render quick and efficient service when needed and we therefore naturally ask what your intention or ruling when such equipment so engaged becomes disabled? If it is to deny them the renewal or replacement parts they will have to go into disuse.

"We wish to further point out with the alleged rumored reduction of new cars that will likely go into effect that it would seem all the more necessary that this great army of used automobiles which is now in service will have to be pressed into even greater service as time goes on, and many being old or used cars it is likewise obvious that the upkeep will constantly increase."

Following the citation of instances showing that the jobbers are at this time a prominent factor in the quick handling of business as depots and distributors for the advantage and use of supplying the government needs and for essential activities, further proof of the great work being accomplished by both passenger cars and trucks in the present emergency was submitted. Appended to this was a classified list of 36 different commercial and civilian occupations that are practically dependent upon the use of motor driven vehicles and which are also indispensable.

To Give the Maximum Encouragement to Repair of Trucks.

The statement concluded as follows:

"We quote from the general pledge given as of date Aug. 13, 1918, applying to motor trucks, the following language: 'To give the maximum encouragement to the repair of trucks,' and we submit that this industry is the only agency through which these repairs must and do eminate. Still with all, as indicated in the foregoing, this is more or less general, and we are satisfied it is not as thoroughly understood as it should be in order to render the best service to the government and the needs incident thereto. We further wish to impress you with our disposition to exercise our every effort and influence in the proper execution of any definitions you may employ or pledge you may require to properly cover these matters both in the letter and spirit, and we respectfully ask that you give the foregoing your careful consideration, and in conclusion we wish to point out that this is not in any way exploiting a new business or expanding present business activities, but simply as indicated above, a question of obtaining the necessary materials and replacement parts that will keep the great army of used automobiles, trucks and tractors that are now used for war and commercial purposes and such other purposes as you may think proper in active service and the general retirement of great numbers must naturally follow if these replacement parts are denied or cannot be had, and will, we fear, seriously impede business generally and stop deliveries which in a variety of ways are so necessary to the success of the government and the conduct of the war."

Essential Users of Trucks and Passenger Cars

Retail Druggists	45,880
Agricultural Implement Dealers	15,258
Retail Bakers	24,674
Wholesale Bakers	2.261
Banks	28.987
Canners of Fruits and Vegetables	2,670
Fish and Oyster Dealers	4.500
Fish and Oysters, Wholesalers	1,047
Flour Mills	12,159
Fruit Dealers, Wholesalers	2,663
Retail Grocers	172,842
Butchers and Meat Markets	55,819
Wholesale Grocers	5,045
Retail Hardware Dealers	28.979
Wholesale Hardware Dealers	10,634
Coal Miners and Shippers	6,159
Harness and Saddlery Dealers	18,486
Hay, Grain and Flour and Feed Dealers	34.218
Hotels	13,740
Coal Dealers	29,128
Ice Dealers	6.254
Dairies and Creameries	6,112
Lawyers	102,034
Retail Lumber Dealers	30,925
Wholesale Lumber Dealers	3,800
Farmers	2,612,235
Physicians	131,495
Flour and Grist Mills	13,358
Sanitariums, Hospitals and Asylums	6,727
Stock Breeders	12,000
Newspapers	18,626
Undertakers	20,688
Nurserymen, Seedsmen and Bulb Growers	5,057
Veterinary Surgeons	5.399
Manufacturers of all kinds	139,630

Another Hearing Will Be Granted After Reports Are Made.

It was also suggested to the committee that they have the members mark in their catalogues the articles considered non-essential, and that after this information has been submitted another hearing will be granted.

Commissioner Webster also announced that the committee had received reasonable assurance in its conference that if the industry could be placed on a strictly essential basis the manufacturers would receive such proportion of steel and other metals as is their proportion of all the materials which it will be possible to divert from the war program of the government.

To carry out his plan the manufacturers, jobbers and dealers are asked to sign a pledge which is as follows:

"I do hereby pledge myself not to use or so far as lies within my power, permit the use of any stocks now in or which may hereafter come into my possession or control, save (1) for essential uses as that term may be defined from time to time by the Priorities Division of the War Industries Board, or (2) under permits in writings signed by the director of steel supply; that I will make no sale or delivery from such stocks to any customer or retailer before thus filing with me a similar pledge in writing; and that I will use my utmost endeavor to prevent the hoarding of stocks and to insure that they be distributed solely for essential uses."

C. H. GRESSLEE DISTRICT SALES MANAGER ALL-AMERICAN TRUCK.

Charles H. Gresslee has been appointed district sales manager for the middle western section of the country for the sale and distribution of the All-American AA one-ton truck.

For the past 18 months Mr. Gresslee has been division sales manager for the Selden Truck Sales Co., having an office at Cincinnati. Prior to his connection with the Selden company he was for three years general manager of the Union Petroleum Co. of Philadelphia and one year sales manager of the Franklin Oil and Gas Co. of Bedford, O., and for three years vice president of B. A. Stuart & Co., Inc. of Chicago.

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Dissecting the Values In a Used Car

Certain Methods Necessary to Use in Locating Defects in the Various Parts —The Value of the Car Is Dependent Upon the Condition of Several of the Most Vital Working Parts

IN PURCHASING a used car the purchaser should know the elementary tests through which to put the car, in order to judge its value. The record of the use of the car, more particularly the carefulness of its former owner in driving and adequately taking care of it, is important to know, for it may have been driven 15,000 or 20,000 miles with good judgment and care and be worth more than a car driven the same distance which had been abused by reckless driving and indifferent care.

One should not be influenced in purchasing a used car by its appearance alone, for it may have a body that looks almost like new and the "guts" of the machine in an advanced state of dilapidation. The safest way to judge of the real practical value of a car is to base its most intrinsic worth on the condition of its vital working parts underneath the hood and the body. A new body can be purchased at a reasonable price or the old one repainted and varnished, dents taken out, worn upholstery repaired or entirely hidden by a set of seat covers; and if the lamps and essential other accessories are missing or in bad condition, they can be replaced or repaired at a slight cost as compared with the greater expense of replacing an entire new power plant, new gear set, or new axle or new axle gears.

It is prudent, therefore, to ascertain just what kind of drivers handled the machine. As the history of a used car is not always easily obtainable, it is always best to exercise one's own judgment in the selection of a used car, by thoroughly inspecting its vital working parts and putting it through a series of tests as follows:

As it is not possible to take down the engine, the gear set and rear axle for critical examination, as the cost would be considerable, certain practises of examination and tests can only be followed out in order to prove its practical worth.

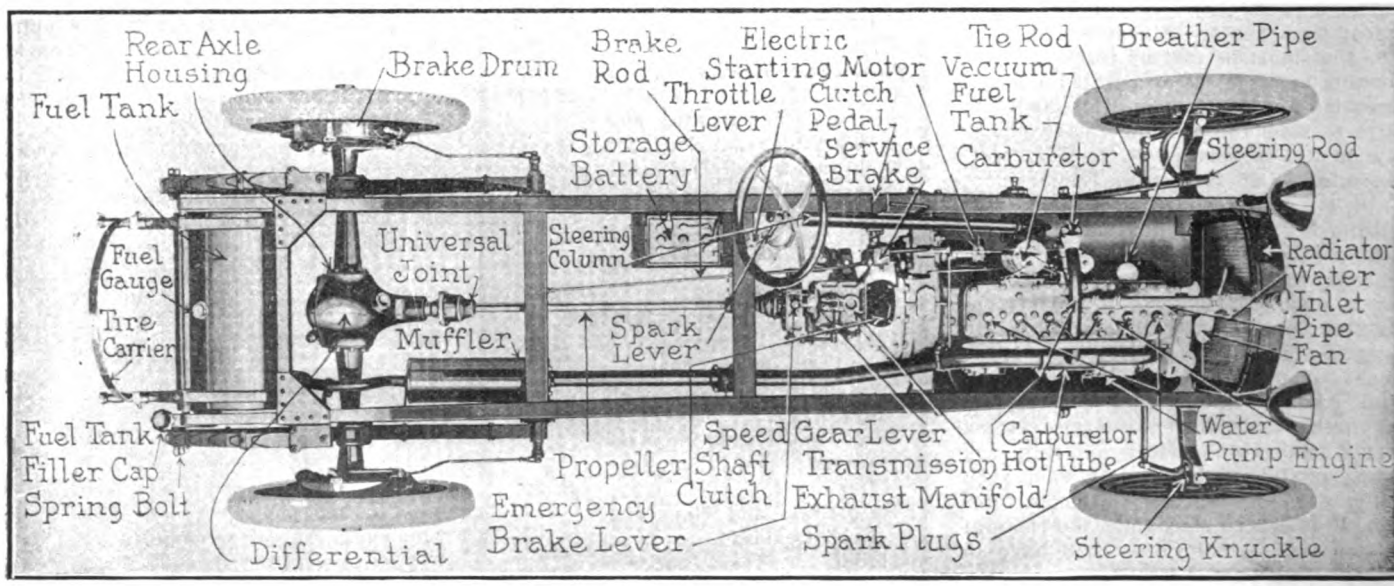


Diagram of the Various Parts on a Chassis Referred to in This Article as Requiring Inspection in Examining a Used Car to Determine Its Condition and Cost of Making Repairs, Replacements and Adjustments.

Fifteen Important Tests of Used Cars

In the examination of a used car the main points to be observed are here given in a nutshell:

Test the compression.
Examine engine suspension.
Look for broken housings.
Examine radiator.
Look at gears in gearset.
Look at bearings in gearset.
Examine rear axle for lost motion.
Go over steering gear.
Measure for wheel alignment.
Try both sets of brakes.
Note condition of tires.
Look over all springs.
Try out electrical installation.
Test the battery.
Make general road test.

Test the Compression.

To run satisfactorily an engine must have good compression, not only in one, but in all cylinders. To test the compression, turn the crankshaft over by hand. If you can feel a fair weight of resistance against a quarter turn, or a number of turns, noting the comparative resistance of each cylinder and the resistance of all, the compression is tight enough to hold. A better method of testing compression is by using a regular compressometer, which, in turn, is screwed into the spark plug opening of each cylinder, and the compression in each cylinder tested separately by turning over the crankshaft. The gauge will register the number of pounds pressure in each cylinder, and the cylinders showing the least compression are the ones that need attention to bring their compression up to equal that in other cylinders. Another test is to open all the relief cocks in the heads of all the cylinders, excepting No. 1, against which you test the compression, by turning the crankshaft; then, in turn open the petcocks on all the other cylinders, excepting that of No. 2, on which you are making the test, and continue the test in the order you started. Good compression in an engine is determined by a springy resistance when the crank shaft is turned over. If the engine cranks freely, it is a sure sign that the compression is weak all around. It is advisable to make these proving tests for lost compression after the car has been run for five miles or a motor run idle commensurate to that distance. In this preliminary test it is possible to detect any other weakness that might in whole or in part be the cause for lost compression, as, for in-

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stance, if the lubricating oil is cold or very heavy, it will fill up depressions or scores in the cylinder walls which might exist, thus giving the engine more compression than it had under ordinary operating conditions. While the engine is being run, note whether there is black or excessive smoke from the exhaust, which is an indication of excessive oil escapement into the combustion chambers, caused by a surplus amount of oil in the base, imperfect, scored or worn cylinders, or improperly fitting piston rings. A surplus amount of oil in the base will give a temporary addition of power and compression to the engine, especially if the cylinders have been scored or worn out of round. The same condition will prevail if too heavy oil is used. Drain some of the oil from the base and let it stand for about 15 minutes, and then you can tell whether it is heavy, medium or light.

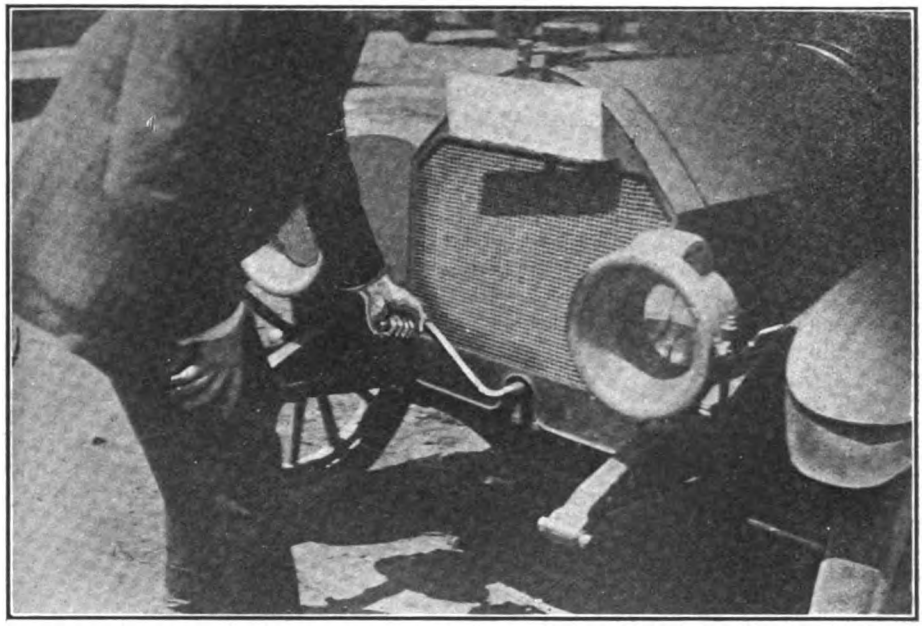
Other Points of Engine Examination.

Throttle down the engine to about 400 revolutions per minute. If it does not backfire or miss it is in good condition. Testing the engine running at from 2000 to 3500 revolutions per minute develops nothing but noise and does not give one the opportunity to detect the defects that the slower speed will give.

Make a careful examination of the engine's suspension, to see that none of the cross members are broken or the engine crank case cracked.

To detect a leak of lubricating oil, look at the outside of engine and transmission cases and if there is any considerable accumulation of oil there, a source of leakage may be found, which is usually due to worn bearings or joints between casing not being properly packed.

Examine the valves and valve tappets. Wear in the valve guides can usually be remedied by replacing the bushings. If, on the old parts there is left no room for adjustment, new parts will be necessary.

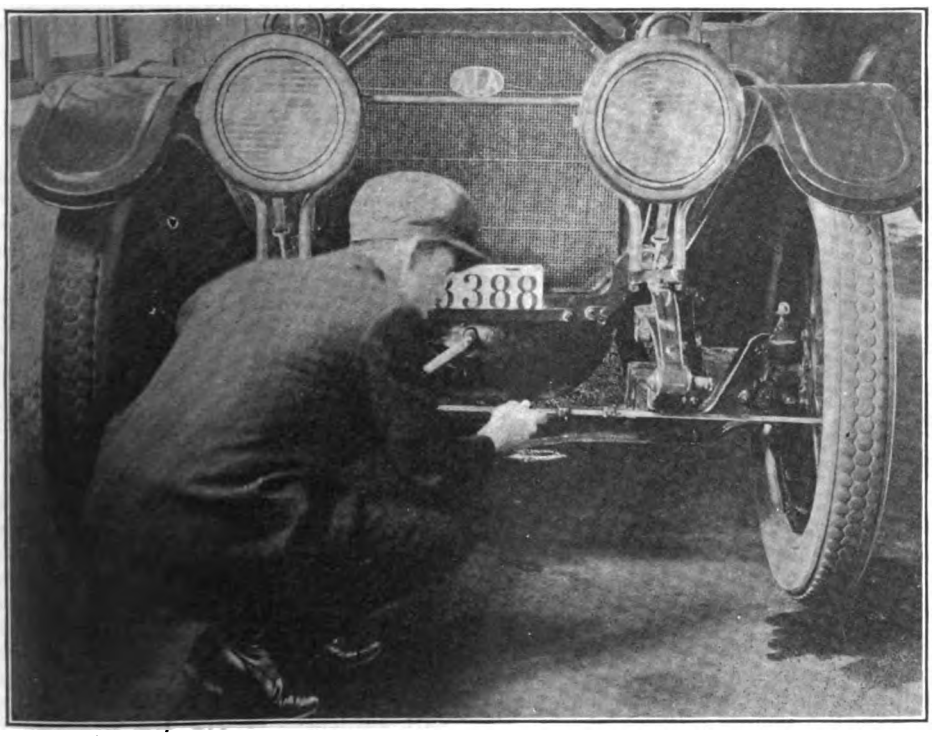


Cranking to Try Compression, First Test Made in Inspecting Condition of Engine.

Leaks in Gasoline and Radiator.

Examine the gasoline lines and tank for leaks, which are easily repaired. Make a comparison of gasoline consumption as compared with other cars of like horsepower and size.

Carefully inspect the radiator and circulating connections for leaks. Any excessive leakage of the radiator can be easily detected by having it stand over a dry spot. At the conclusion of the road test see that the water does not boil or steam to any extent. An efficient radiator should be able to keep the water below the boiling point.



Examining Wheel Alignment with Gauge to Determine if Steering Knuckles and Tie Rods Need Adjustment.

Looking for Worn Gears.

Take off the cover plate on the transmission case and examine the gears. This unit in particular has usually been subjected to abuse. If the gears have been sheared off and burrs have been formed on the teeth, the operation of the transmission will emit a grating and noisy sound when shifted. If such a condition is found and allowed to continue, before long the teeth of the gears will break. Any lost motion in the gears can be easily taken up. The condition of the clutch arms and gear clutches in this unit is nearly as important as the condition of the gear teeth.

The rear axle housing of many cars is fitted with a large hand hole plate at the differential. By removing this plate the main drive gear, or master gear, is exposed. Although this gear receives all the power from the engine, it very seldom shows any signs of excessive wear. It is the small pinion that meshes with it that shows the most wear. The master gear is mounted on a housing which revolves with the wheels. The condition of the differential gears, which are inside of the housing, cannot be seen unless axle is disassembled. The condition of these gears can be closely estimated by these tests: Jack up one rear wheel, release the brakes and turn the wheel slowly in either direction. The action should be smooth and the shaft should turn in the transmission gear set as soon as the wheel is turned. Then put in the high-speed gear and clutch, with ignition switch in off position. The propeller shaft is now connected with the engine and the wheel can be swung back and forth, this operation indicating that any movement not affecting the propeller shaft is lost motion in the differential. Before putting back hand hole plate, it is a good plan to find whether the wheel can be turned and how far without affecting the master gear. There should be little or no lost motion between either of the wheels and the propeller shaft. The experiment should be tried

(Continued on Page 58.)

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Commercial Hysteria

National Commissioner Webster of the N. A. A. A. J. Views Situation As It Affects Jobbers

Probably one of the greatest misfortunes that can befall any business is to have the head of the institution seized with what is commonly known as modern commercial hysteria or a lack of nerve.

While it is true that we are now going through very troublesome times, it calls for every acumen, every atom of nerve and every element of cool headedness in the operation of business. Therefore, to those who are inclined to become rattled, I would suggest that they sit tight and not rock the boat in the middle of the stream, and if they will pursue this course, eventually things will come out all right, for you can rest assured in the old saying, in war times as well as in peace, there is a silver lining in every cloud, and the sun's rays will strike those who exercise calm judgment much sooner than they will those who in a moment of excitement can only see trouble in the darker recesses of their every day business pursuits.

In many instances the jobbers are packing up large quantities of materials and shipping them back to the manufacturers. In some instances it is old shop worn, obsolete goods that have been out of date for some time. In other cases new goods marketable in every way, and if the present conditions exist, restrictions in steel and other metals prevail, the jobber will, no doubt, regret before many days, having permitted this element of hysteria to actuate him and get rid of these goods, that sooner or later will be worth a great deal more money if, indeed they are at all obtainable, and this is all the result of undue excitement because there are so few goods, if any, on the jobber's shelves in the automotive equipment line that cannot and will not be used either by adjustment or transformation or something of that sort because history will repeat itself and we are finding in other lines that goods that have remained upon the shelf for years and have become obsolete are now taken down, transformed and put in use at good market prices.

The used cars are bound to and will be run on each succeeding day will be pressed into service in greater numbers, and the longer these cars are run the more equipment they will require in upkeep and the greater chance for the jobber for not only selling stock that he bought at moderate price for more profit, but also working off lines of obsolete goods that you have seen time and again when scarcity prevails.



William M. Webster, Commissioner of the National Association of Automobile Accessory Jobbers.

There is another side to this issue. We should not return these goods without first consulting the manufacturer and consequently we should not strip ourselves of stock, for if we have the money to carry it we can make by far more profit out of the goods that are being returned than you could hope to secure from a credit memorandum that you would get on their return.

WILLIAM M. WEBSTER.

MAKE FREE RIDE PLAN GENERAL.

"The idea of displaying a sign on the windshield offering free rides to soldiers and sailors, has taken America by storm," said Mr. P. L. Emerson, general sales manager for the Olds Motor Works, in a recent interview.

"Nothing could be more typically American, or display a finer patriotic spirit. But to my mind," he continued, "that should only be a beginning. The vacant seat should be eliminated whenever possible.

"There are innumerable ways in which this idea can be applied. For instance, very often in driving through the country one passes a wayside interurban station at which a lone passenger waits for a car. To give such a person a lift is not merely a friendly act. Every man's time is valuable these days—essential, in fact—and the minutes saved will be turned to good account. It costs nothing to stop and the passenger will be saved money as well as time.

"Here is another case in point. You meet a traveling man at lunch in a small town hotel dining room. His next call is at a town only 20 miles or so along the line. But there isn't a train in that direction for three hours. The town is on the route you are traveling. By giving him the necessary lift a full half day of his working time is conserved for him.

"It has been my experience that people are more than grateful for such thoughtfulness; in fact, when it is suggested to them they are more than glad to donate the actual saving of money to the Red Cross.

"Now that the government has requested the strict conservation of gasoline, every drop should be made to work to its full capacity. That means abolishing the vacant seat entirely."

MANUFACTURERS OF TIRE FILLER TO HOLD ECONOMY CONFERENCE.

Manufacturers of tire filler have called a conference to be held at the Hotel Congress, Chicago, Sept. 15-18, with the object of forming a national association of makers of standard tire filler and to draw up a plan for war time conservation of tires.

Twelve manufacturers will participate in the conference of which Frank D. Mayer is the temporary secretary. The companies interested are: The Essenkay Products Co.. Chicago, Ill.; the Peerless Tire Filler Co., Chicago, Ill.; Dahl Punctureless Tire Co., Minneapolis, Minn.; Pan-American Rubber Co., Milwaukee, Wis.; National Rubber Filler Co.. Midlothian, Tex.; Panama Rubber and Equipment Co., St. Louis, Mo.; Wolverine Tire Cushion and Accessory Co., 1678 Fort St., West Detroit, Mich.; Rubberair Inc., 711 Times Building. New York City; Bettern-Air Co., 1308 Callowhill St., Philadelphia. Pa.; National Synthetic Tire and Rubber Co.. 1482 Broadway, New York City; Universal Tire Filler Co., Portland, Ore.; National Tire Cushion Co., 1511 McGee St., Kansas City, Mo.

FAWSCO OIL COCK WRENCH.

The condition of the raw material and labor market has made it necessary for J. H. Faw, Inc., to advance the list price of the Fawsco Improved Combination Oil Cock Wrench Gasoline Gauge and Cleaner from 35 to 45 cents. It became necessary to either deteriorate the quality of the product or increase the price to meet conditions and it was decided



to maintain the Fawsco standard at a slightly increased price.

Mr. Faw in a characteristics vein with which the trade is quite familiar, says that to a Ford owner who has lost his Sunday religion by soiling a clean shirt in an endeavor to find out whether he has sufficient oil in his crank case for a day's run, the slight increase in price cuts no figure; in fact, the demand has considerably increased since the new price went into effect.

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The time has passed when the motor car dealer, repairman, garage owner and service station can get along with slipshod methods. The new business situation for people in this line presents problems that require more than the average amount of planning and effort which was sufficient in normal times. Every live dealer in cars or accessories or the man who makes his living by the repair and maintenance of automobiles is putting his business on a system which means 100 per cent. efficiency. No one man can evolve all the new ideas or plans, so much can be gained from the other fellow who is actually putting tried and successful methods into practise. As a means of giving the subscribers an opportunity to learn from others, the Automobile Journal is running a number of stories telling of the results being attained by practical men who have carefully studied their business with the object of placing it on a basis of maximum efficiency.

A Service Station Where Standardized Operations On Repair Work Have Brought Remarkable Efficiency

Bishop, McCormick & Bishop, Inc. Through the Use of Special Tools Equipment and Carefully Planned System of Handling Work Have Solved Many of the Problems Upon Which Depends the Prosperity of The Motor Car Dealer, Repair or Serviceman—Charges Are Made on Flat Rate Basis As a Fixed Period of Time Is Allowed For Each Job

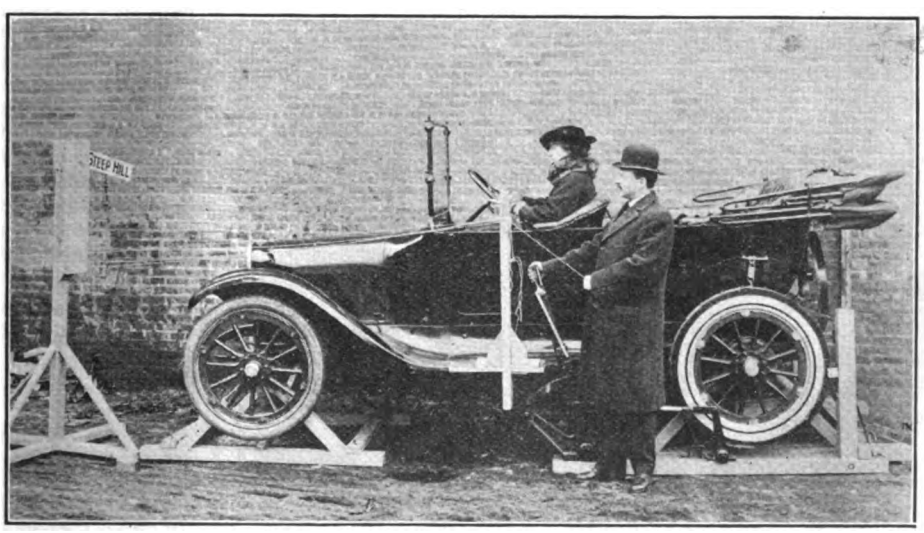
THERE are hundreds of automobile dealers and repair men throughout the country that are at present scratching their heads in vain to arouse the idea which they know will be necessary to enable them to cope with the new conditions of business that have developed with the war activities. Many of them find themselves in the same situation as did the man who locked the barn door after the horse had been stolen.

On the other hand there are also hundreds of dealers in the country who did not wait for the situation to get to the acute stage where the old policies in the automobile trade would no longer suffice, but who put their house in order to meet any emergency should it arise and enable them to continue a profitable business against the most adverse circumstances.

Bishop, McCormick & Bishop, Inc., Brooklyn, N. Y., distributors of Dodge Brothers, is a firm whose policies illustrate in a striking manner the possibilities that are open to every dealer who puts a little thought into his business and systematizes it along practical lines. This company covers all of Long Island and Brooklyn and has 17 subdealers.

Burton T. Bishop, sales manager, is the type of the modern sales executive who in close team work with his associates has injected into the sales of motor cars the real science of selling. His is the new era of selling, backed up by character, conscience and an exemplary model of service, supplemented with a clear vision to anticipate the unexpected and being forearmed with the clinching argument to convince the most skeptical. He is an apt student of human nature, having a delightful faculty of humoring the individual, natural tendencies of a prospect so as to convince him that he can have his eyes open to the truth; and he invariably closes sales with the most lingering prospects. He says that one of his most difficult tasks is to train his junior salesmen to not talk too much and talk themselves out of a sale. He instructs them to allow the customer to ask questions and to give them a chance to do so between pauses in their selling argument, for which they must anticipate and make openings.

Mr. Bishop deals with only the real facts and leaves nothing at which the prospective customer must guess. He says that once a prospective purchaser enters their sales room, he is considered 90 per cent. sold, this being principally attributable to their constant educational advertising campaign. The prospect knows in advance of his coming to their sales room what he can expect of Bishop, McCormick & Bishop, Inc. by way of their educational and mechanical service. In fact, he has already been so impressed with the great help



The Anchored Car for Instruction on Driving Operations Under Varying Road Conditions.

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that the firm makes a part of the understanding of every sale that he has practically sold himself, but has merely come to the sales room to finally convince himself of the reality of what he has read in the original and convincing advertising booklets and sales letters sent him by Bishop, McCormick & Bishop, Inc. Every customer is sold in a straight forward manner, with an explicit understanding that there is no free service thrown in with the bargain. He is sold to stay sold and to first secure the impression of satisfaction that remains with him, because he has been started right.

Over 1600 Cars Sold This Season.

Bishop, McCormick & Bishop, Inc. have sold in their Brooklyn and Long Island territory this season 1640 Dodge Brothers cars. Some of the salient features that have been instrumental in their securing this business are:

A continual brilliant advertising campaign through local newspapers, their own original copy and layouts of handsome, attractive advertising matter in the form of booklets and folders, and direct personal sales letters, which are the most convincing the writer has ever seen.

An excellent mechanical service backed by the most efficient, time and labor saving machinery and mechanical equipment, supplemented with special tools of their own design, and all directed by a highly capable service manager.

An equitable, honest cost system upon which to base charges for service.

An educational department in which they train customers to become capable and careful drivers, instilling into them the practical knowledge of motor car construction and the causes of troubles and the proper adjustments and remedies by which they may be overcome by the owners' knowing first hand how to do the work. They have eliminated over 50 per cent. of the troubles that freely come to a great majority of dealers, by fitting the purchasers of their cars to be aidful to themselves instead of helpless and an unnecessary burden to dealers and garage men.

Bishop, McCormick & Bishop, Inc. will not sell a car to a new owner unless he first proves his ability to be able to understand the principles of motor car construction, the causes and effects of irregularities, how to detect and simply remedy them, before they will have gone to the danger point, with the possibility of aiding to contribute the weakness to other parts of the car.

Burton I. Bishop, the sales manager, says that if he sold a car to a new owner who, through the lack of practical experience in knowing how to drive, collided with an obstruction and battered up the fenders and other parts, considerable of the responsibility for such an accident would reflect upon his firm. He holds that the appearance of one of their new cars wrecked in such a manner would leave a poor impression on the public, to the effect that the car was poorly constructed and lacked stability. He correctly lays the responsibility of such accidents right at the dealer's door, because he failed to thoroughly train the owner how to carefully drive the car. He says that sales of cars to irresponsible operators are examples of insincere salesmanship, that the interests and welfare of the customers make up the foundation of satisfactory sales.

Extracts from Sales Letters.

Here are a few striking extracts from several of the company's sales letters, circulated to advertise their educational department:

"There was a time when we might have agreed with you that you could not afford to own a motor car, but that time has passed.

"Economy is not a matter of doing without something so much as it is doing well with something. That thought applies to every phase of life, but especially is it true of the use of an automobile. True economy is the science of buying more with each dollar you spend, and then making what you buy give the maximum results."—From a letter illustrated at the top with their duplex control car and a street crowded with traffic, suggestive of their driving instructions.

And these "punchy" extracts are from another letter printed on a letter head with the same illustrations:

"When Colgate & Co. couldn't improve their talcum powder they improved the box that contained it.

"As Dodge Brothers dealers we face a situation somewhat similar to Colgate's. Dodge Brothers car has demonstrated its goodness to the satisfaction of the public. Its reputation for steady, consistent performance is so well established that it is taken for granted. * * *

"The usual methods of driving instructions could be improved upon. They are inadequate and nerve-racking, leaving too much to be learned at the risk of the car. So we developed the two devices shown at the top and on the back of this letter head (duplex control car and the anchored car). With them learning to drive correctly is simply a matter of practise under easy and favorable conditions, without strain or risk. But what is most important the purchaser actually becomes a finished and experienced driver before he attempts to operate his own car. Thus we meet a responsibility as dealers." * * *

Now listen to what they say in part in another sales letter on their school for instructing new owners, printed on their letter head illustrated with a picture of their school at the top and a picture of the Dodge chassis on the back:

"The old saying, 'A poor workman is always complaining about his tools,' is just another way of saying he does not know how to use them.

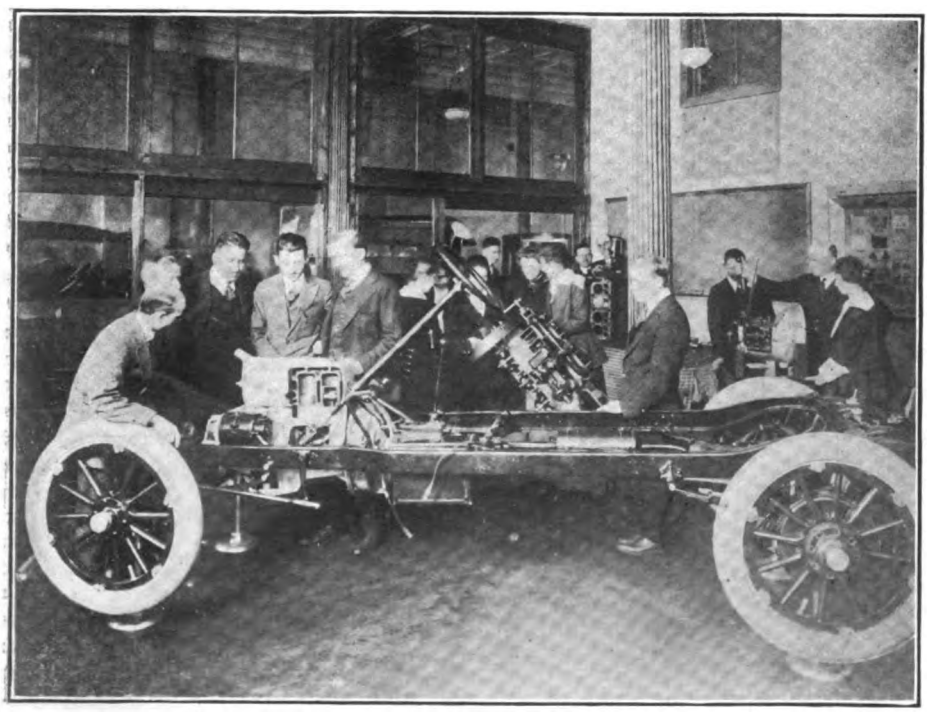
"The wonderful economies of automobile manufacturing are the result of training workmen to use tools correctly. Yet the greatest part of the maintenance cost on motor cars is a penalty paid by owners because dealers have not taken the pains to teach them all they must know about their cars to get the best results from them.

"Realizing this we developed our method of instructing owners to drive correctly. Then we started our school for owners, offering a simple, easily understood course of lectures on the mechanical construction of the car and its proper care and maintenance. The results obtained have been remarkable." * * *

Driving Instructions in the Anchored Car.

The system of driving instructions is based on the conclusion that the operation of a car is nothing more or less than the proper order of certain mechanical operations performed at the right time and in the proper manner, or, in other words, the proper training of the eyes, hands and feet.

Realizing from the start that it would be difficult to give intensive training of this kind in a car that was moving, be-



Section of the School, Showing Chassis Used for Instruction.

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cause its very movement would tend to distract the pupil and prevent him from concentrating his attention on the proper performance of the mechanical operations, Bishop, McCormick & Bishop, Inc., developed a machine which they have patented and named "The Anchored Car." It is a standard Dodge Brothers motor car raised off the ground and equipped with apparatus that permits them to duplicate actual road conditions in a stationary car, with the motor running. Seated in this car the pupil practises starting, stopping, backing, climbing hills and pulling through sand before he attempts to put a car into actual operation on the road.

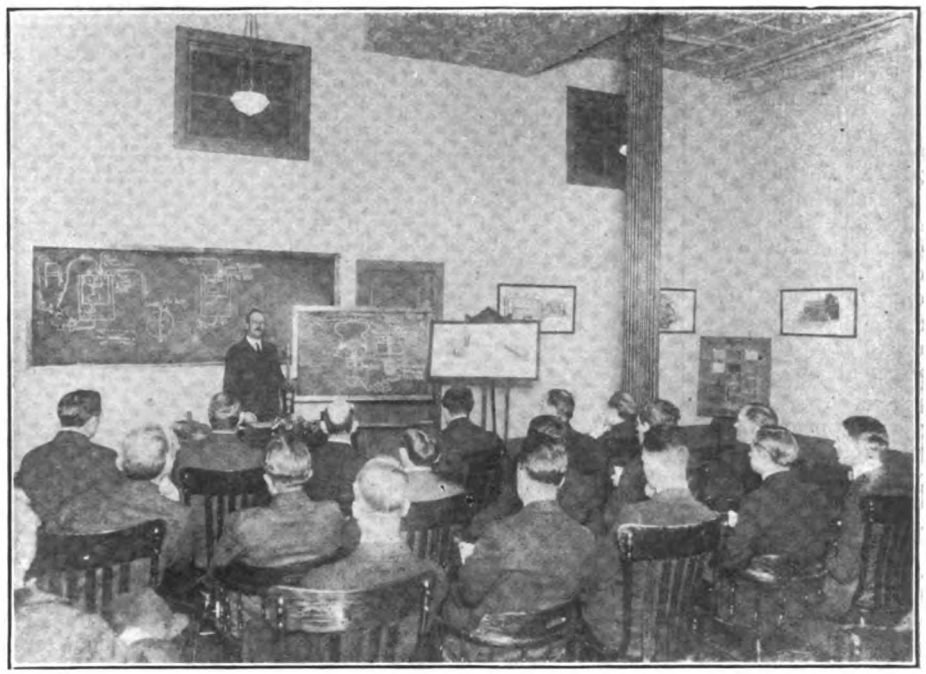
After the first lesson the practise on the anchored car is directed by a series of signs operated by the instructor, through which actual road conditions are visualized for the pupil. Thus starting gradually the efforts of the pupil are confined solely in the first lesson to an understanding of the mechanical operations, through the signs and the reasons for the performance of the operations. The instructor develops in the pupil's mind that quick reaction to sudden changes of conditions which is essential to correct and safe driving.

Aside from acquainting the pupil with the construction of his car in relation to its operation the instructions on the anchored car, the general principles governing the operation of a gasoline automobile, describing each unit in detail, and other mechanical instructions in the school course are given in a brief text book prepared and published by Bishop, McCormick & Bishop, Inc., entitled "Driving Instructions." This book is supplementary to Dodge Brothers' "Book of Information" furnished with each car. After four or five lessons with the anchored car one lesson is devoted to the lubrication of the car, and in this lesson the entire oiling system is explained.

Road Work in the Duplex Control Car.

The pupil is given his lessons on actual driving and road work in the duplex-control car, perfected and patented by Bishop, McCormick & Bishop, Inc. This car is so designed that all the essential parts of its operating control are duplicated. It has two steering wheels, two sets of clutch and brake pedals, two accelerators, arranged so that the control operated by the instructor dominates that used by the pupil; thus it is possible for the instructor at any time to instantly take control of the machine without reaching over or interfering in any way with the pupil.

The duplex-control car permits the instructor to start road instruction under actual operating conditions, and instead of seeking unfrequented streets he may hunt out the busiest ones, going through congested traffic with safety, doing everything that will be necessary for the pupil to do himself when his instruction is completed. By this method the pupil learns to operate the car and acquires experience at the same time without risk, nervous strain or delay. After a few lessons on the duplex-control car the pupil is ready to take final instructions in driving his own car. It is surprising to see how his previous instructions have become second nature to him. He even ventures into congested traffic, with the dangerous risk reduced to the minimum.



Class Room of School: New Owners Listening to a Lecture Being Delivered by the Mechanical Engineer Instructor.

The School for Owners.

The Bishop, McCormick & Bishop, Inc. school work is in charge of a mechanical engineer who is also an experienced instructor. The class room is equipped with a complete stripped chassis and a separate sectioned engine showing all the working parts. Every unit of the car is mounted separately—for instance, the gearset and the final drive and differential are mounted with the gears exposed and the proper connections made, so that its operation is plainly shown. Carburetor action and gasoline feed are explained with the aid of glass-paneled working models. The electrical apparatus is thoroughly treated, including the care of the storage battery. The lessons are designed not only to explain the construction of the car and the mechanical features that make its operation possible, but also to impress upon the owner's mind the things that are likely to happen if the car is not properly operated and maintained.

Driving instructions are furnished without charge to one driver for each car purchased. Additional drivers are instructed at the rate of 75 cents for indoor lessons, 75 cents for road lessons in the pupil's car and $1.50 for road lessons in the company's car. A nominal charge of $7 is made for the course in care and maintenance, which is covered in seven lessons, which are supplemented by a set of preliminary instruction pamphlets for home reading.

The company has lately added a course in shop practise to keep the users of their commercial cars in touch with mechanical methods of upkeep, which have been standardized in their own commercial car department.

Their educational department has been instrumental in creating many new car owners. Their methods of instruction are so practical that the most timid person is readily convinced that by such training he can become a better driver than the average car owner.

The Company's Policies of Efficiency.

Clifford M. Bishop is the secretary and general manager of Bishop, McCormick & Bishop, Inc. He impressed the writer as a forcible character; indeed, as a man of exceptional attainments and of great initiative. Many of the ideas from which a working system was evolved emanated from him. Those ideas were not mere flights of thought, but after they were accurately balanced in the scales of judgment by the other members of the company at the counsel table they were approved as practical of incorporating into a workable system from which they have obtained an efficiency in service and also a profit. Mr. Bishop is also the advertising manager and his work in this line stamps him as a genius. Considerable of this company's success is attributable to his ability in molding public opinion; his advertising work is truly educational and a treat and inspiration to those who receive it and appreciate its real value.

Here are the company's policies of efficiency, as summarized by Clifford M. Bishop:

"Discussing particularly our standard practise and standard time charge repair system, we would say that it represents the result of 13 years of study of the repair problem. We have gone through the business from almost every angle. We have operated a garage, handled two or three lines of cars, and we have tried almost every new idea and new experiment that has come out in the business, and we have arrived at certain fundamental conclusions which form the basis of our business, and upon which everything else is predicated.

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These conclusions are:

"First: That it is not profitable to operate together a sales agency and a garage, if there is any possibility of extending the sales end of the business to a sufficient extent to bring the financial return warranted by the investment.

"Second: That it is not nearly so profitable to handle two or three lines as it is to handle one line with sufficient territory to secure a satisfactory return.

"Third: That the simplification of a business for one good line of cars and the necessary departments to meet the moral and material obligations to purchasers produces an increase in profit that greatly exceeds any profit that might result in the handling of two or more lines of cars, or from the introduction of other departments that interfere with the efficiency of the whole.

"Fourth: That it is not possible to operate an automobile business profitably except on a cash basis.

"Fifth: That it is not possible to operate it on a cash basis satisfactorily unless the business is so organized that the price of work based on the exact knowledge of the cost of materials and supplies, can be told to the customer in advance.

"Sixth: That it is possible to apply the principles of manufacturing efficiency to the repair work, and that the return in profit to the dealer and in satisfaction to the customer warrants any expense necessary in the installation of a system.

"Seventh: That unless the sources of conflict with customers and the arguments and loss of time involved in such conflicts are eliminated from the business it cannot be truly successful."

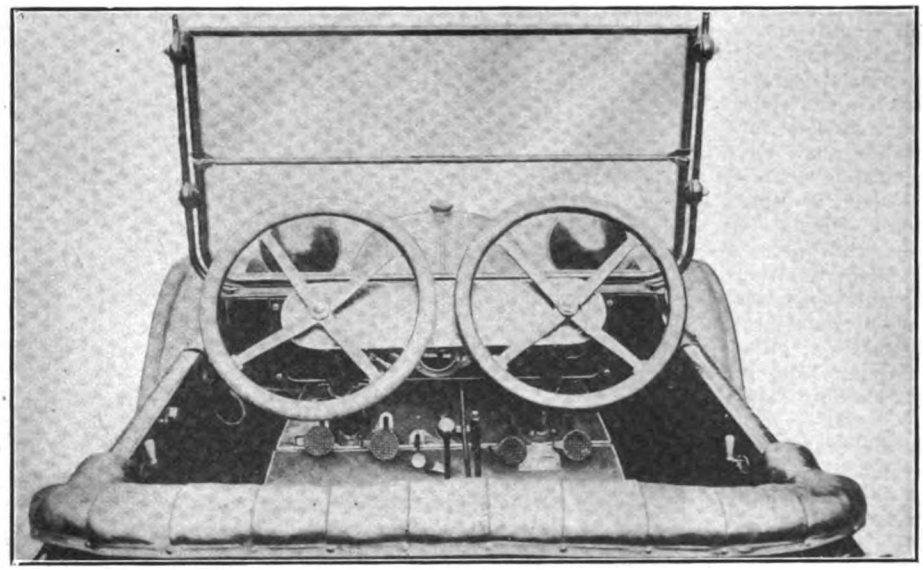
Conditions Prevailing on Basis of Variable Charges.

Bishop, McCormick & Bishop, Inc. have adopted the flat rate of charge for various operations of repair work, such as cleaning engine of carbon, grinding valves, overhauling the transmission gearset or adjusting and repairing the differential gears, etc. (See example in illustration, Fig. 1.) They have standardized these operations and their thoroughly tried out cost system has enabled them to establish a standard cost on each operation, from which they make up their price to charge the customer.

Mr. Bishop explains as follows the conditions that obtain where repair work is not done on the flat rate:

In the first place the customer comes to the repair department, troubled with a noise in his motor. He wants to have the noise eliminated and the shop foreman estimates roughly what it will cost to eliminate the noise. He generally makes his estimate high enough, or attempts to make it high enough to cover any contingencies. He does not know at the time what workmen will work on it and he is gambling in his estimate, both on the conditions that may exist in the motor and on the ability, manner and method of the man who does the job. We will say that he tells the customer $100 and when he goes into the work he finds it will cost $150. The customer comes in prepared to pay $100 and when he finds he has to pay $150 he is probably not prepared mentally or financially to meet the obligation. The result is quite likely to be a breaking down of the cash-on-delivery system in this particular case and the assumption on the part of the dealer in the gamble of $50, or it may be that the job only costs $85 and the customer has been told that $100 would probably cover the job. He is quite likely to leave with the impression that he has been robbed at $85 because mentally he figured the job at $60. It is easy to see how much unnecessary time it is going to take the foreman or service manager and his assistants in handling the case whatever the charge is, which represents the dealer's side of it. Now as to the customer's side: He has left his job with the repair shop and he has no definite idea of how the shop is going to do the particular job, or who is going to do it, and they have no idea of how many demands may be made on them for small units of time in emergencies.

It may be necessary to pull a man off this job and put his time on another job temporarily, or to have him leave what he is doing and assist somebody else. There are no adequate provisions made for keeping track of the time lost in that way, therefore, the customer's job charge is quite likely to represent so much time actually put on the job and some time spent sweeping the shop or assisting other mechanics, moving cars and doing any one of the many things that arise in the operation of the ordinary repair shop.



The Duplex Control Car Used by Demonstrator to Check Up Driving Efficiency of Pupil.

It is also quite likely, too, that the reason the charge was $150 on the job is because the mechanic did not do the job right the first time and it had to be done over again. Of course the customer does not know this, but the service manager has employed the best mechanics that he can secure and the customer must pay for the time they spend regardless of whether it is spent efficiently or not. Therefore, he feels entitled to the $150 and he is going to get it. Let us consider one other angle, the proprietor in the business. Assume he is earnest, honest and anxious to please and that he cares a great deal about the good will of his customers. How can he possibly check up what a service manager is doing and on what possible basis can he decide whether his shop has been fair to the customer or not? How can he adjust a dispute except on the principle that the customer is always right, and if he adjusts disputes on this basis how can he possibly avoid a tremendous financial loss in his service department, or if he backs his foreman up and insists on the payment of the charges, how can he avoid an equally great loss of good will?- This is the briefest kind of a summary of three different angles on the question. Now let us take them on the other basis:

Standard Time, Method and Charge.

Let us assume that the shop is being conducted on the standard practise, standard charge basis. The first thing to be considered is the overhead expense of the shop, including the testing of cars before work is received and testing again before delivery is made to the customer, the necessary clerks and office help to keep track of the system, cleaning up of the shop, moving about of cars and the doing of any chores that are necessary, these functions being entirely eliminated from the mechanics. Having decided what this overhead expense is it may be divided over the number of working hours of the shop, and when added to the average rate paid to mechanics and the profit desired per hour, we can arrive at a rate per hour which accurately represents the value of that hour of work to the customer.

Now let us consider as a second step that the shop foreman and the mechanics working on the job are entirely out of contact with the public. The receiving and the handling of repair work is accomplished by a separate organization consisting of a courteous and thoroughly competent clerk, and four or five testers,

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according to the size of the business. This is what we will call the contact end of the service department. Now let us go back to the repair shop for a moment and consider that through accurate records, for a long period of time, we have been able to evolve the average cost of doing most of the operations, split up into as small units as possible, which may be necessitated by the car we are selling. Let us analyze these operations and the method and manner in which they are performed to arrive at two things: First, the average time of each operation, and second, the best method of doing that operation. Then let us develop an average time for the operation, which we will call our standard time, and a method of doing the operation, which we will call our standard method. Multiply the time by the rate per hour and we develop a standard charge for the operation.

The Standard Job and Flat Rate.

The service department of Bishop, McCormick & Bishop, Inc. also establishes what tools shall be used on the operation and they become the standard tools. They specify also what parts may be required for the operation. They use a printed form for that operation which contains each step in the operation in its proper order, each tool necessitated by each step and what parts are necessary. The combination of this operation, with several others, makes up a standard job. It is only necessary to allow sufficient time at the start of the operation for the mechanic to gather together all the tools and parts he may need and to see that the car is properly placed for him, and to add at the end of the job sufficient time to permit him to gather up the tools, clean up the part of the car he has been working on and return the tools to the tool room. They have a unit standard job printed so that when the contact end of the service department receives from the customer an order to do that particular job it is only necessary for the shop foreman to assign a man to it, who receives the printed form from the shop clerk and starts to work. There is no need of wasting any time explaining anything even though the workman may be a new one; if he can read and knows how to handle tools he can do the job and he will do it in the same way that any other mechanic in the shop would do it in approximately the same amount of time. The law of averages, of course, applies: one man may be faster than another, but in the long run the average is maintained for both customer and dealer. Every element of gamble has been eliminated from the job. If there is any waste of time or loafing or inefficiency, that becomes an item of cost for the man responsible for it, the dealer. It is reasonable to suppose, under the circumstances, that he will take due precautions to see that there is no lost time and no inefficiency, because he has burned his bridges behind him, so far as the customer is concerned, when he set a flat rate for the job. That is his evidence of good faith to the customer and is the investment he has made for efficiency.

Now the rate per hour is, of course, a secret rate and it is not a matter of concern to the customer, provided the job cost is reasonable. It might be 50 cents an hour or in the highly developed and thoroughly efficient shop it might be $2 an hour. The customer is not concerned with how much the shop is making, he is concerned solely on what he will get and how much he will pay for it. What a wide range of efficiency this opens to the dealer? He can equip himself with special tools of various kinds that will cut his labor time materially. In fact, every time he introduces a new element of efficiency he does it with a profit to himself. He holds in his own hands all the factors of success or failure.

Easy to Collect Cash When Price Is Established.

Now let us consider the customer: He comes to the service department and meets this efficient and courteous clerk we were talking about, and an exceedingly competent tester is sent out with him in his car and they ascertain what the trouble is with the car. The tester reports to the clerk and the clerk tells the customer what his car needs and how much it will cost him to fix it. The customer then may say "it's too much," and the clerk then replies "that's our charge for the work and it is the only charge that we have;" then the customer may decide whether he will have the work done or go somewhere else and

BISHOP, McCORMICK & BISHOP, INC.
18 & 20 HALSEY STREET
BROOKLYN, N. Y.

STARTED (STAMP IN TIME CLOCK) FINISHED (STAMP IN TIME CLOCK)

Standard Practice Operation - G I - Clean Out Carbon Dodge Brothers Car.

CAR NO._____
LICENCE NO._____
JOB NO._____
CUS. NAME_____

ORDER THE FOLLOWING PARTS BEFORE STARTING WORK.
*1 Top Water Hose. 1 Cylinder Head Gasket, 1 lb Waste and Rags on Requisition No.*_____

GET READY BEFORE STARTING WORK
All Tools and Appliances Listed Below.

		ORDER OF WORK	TOOL OR APPLIANCES	FINISHED
	1	Place Car, Get Tools and Parts Ready		
	2	Drain Radiator. Take off Stay Rod	Bucket	
	36	Disconnect Carburetor. Stuff Manifold with Rag		
	4	Disconnect Wires from Spark Plugs		
	5	Take out Spark Plugs	D. B. Wrench 1145	
	6	Remove Cylinder Head and Top Hose	D. B Wrench 1146	
	7	Remove Cylinder Head Gasket		
	8	Clean off Carbon		
	45	Wipe off Valve Seats with Rag		
	49	Put Oil on Valve Seats		
	35	Turn Valves with Screw Driver to Seat Them		
		Summon foreman for inspection of valves and cylinder walls before further work is done		
	363	Blow out Manifold	Conpressed Air Appliance	
M	37	Bolt on Carburetor		
	20	Put on New Cylinder Head Gasket		
	21	Replace Cylinder Head and Top Radiator Hose	(Same D. B. Wrench 1146)	
	22	Clean Spark Plugs - Adjust Spark Gap	Delco Feeler	
M	23	Replace Plugs		
	24	Connect Spark Plug Wires		
	25	Fill Radiator - Run Motor Till Warm	Bucket	
M	26	Set Up Cylinder Head Nuts		
	29	Pick up Tools. Clean up car.		

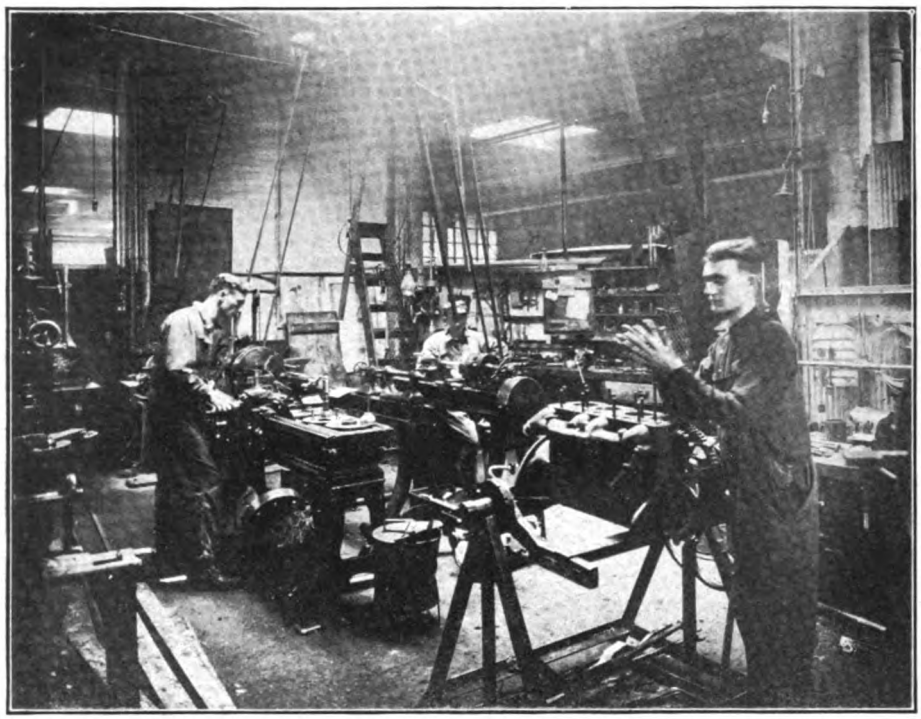
MEMO OF ASSISTANCE

	TIME		WORK	
MECH. NAME_____	NO. _____	FROM _____	TO _____	
_____	" _____	" _____	" _____	
_____	" _____	" _____	" _____	

SIGNED. _____
Mechanic In Charge Of Job.

Fig. 1—Blank Form as Example of a Standard Operation of Repair Work.

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Section of the Machine Shop. A Lathe Hand Is Turning up a Bearing Carrier for An Extended Dodge Brothers Chassis and Another Lathe Operator Is Facing Off a Valve, and the Third Mechanic Is Hand-Finishing Valves That Have Been Ground with the Electric Grinder.

have it done, but either way there is no reason or hope of gain through argument. If he leaves the job and the clerk has told him $100, he knows it will only cost him $100, and when he comes for the car he goes out with the tester and if the car is all right he pays his $100; if it is not all right it is made right at the dealer's expense before the customer pays the $100, because it is the dealer's fault. What possibility is there for argument? Following out the case illustrated under the old method, let us consider when there is a noise in the car. Under standard practise Bishop, McCormick & Bishop, Inc. never accept a general order to accomplish a definite result. To illustrate, they would not think of taking an order from a customer to eliminate a certain knock or sound from his car; that would introduce a gambling element entirely foreign to practise because there are no contingency margins in the system; therefore, in a case of that kind an order would be taken and a charge made for opening up the motor to examine it and then when it had been examined another order would be taken to do specific things to the motor and they guarantee that the things they attempt to do will be done properly, but not that they will accomplish any definite result; for instance, if they found the main bearings loose they would agree to fit them at a price and that the work would be done properly and so on through the various items involved. Under the old system Mr. Bishop says he has seen orders taken to eliminate a sound from a car where the motor has been taken down and put together two or three times and the noise remained. In standard practise that may be possible, but it is extremely unlikely, in view of the fact that an examination involves the micrometer measurements of cylinders and pistons, as well as examination of all bearings, and it is reasonable to suppose that if a proper examination is made beforehand every other possible source of trouble will be detected, and since standard practise involves the same system of inspection that is used in new car manufacturing, such for instance as the stopping of a job at a certain point until the foreman's O K has been given to proceed. It is not likely that the time will be wasted on a job, any of the steps of which have been properly done. When a customer has had his work done by this method he will not willingly go back to the old system. In such a simple operation as grinding valves, under the old system he might come in and have the work done for $5 at one time and then the next time it might be $8, depending on the condition of the valves and the ability of the man working on the job. In standard practise he would pay the same price both times and again the possibility of argument over various charges is eliminated.

It is easy to collect cash from the customer when he knows in advance what he is expected to pay. Even in the case where there is a condition inside of the motor which cannot be ascertained until it is opened; when it is opened a definite charge is given him in advance for the work; therefore, there is no reason why he should not be prepared to pay for it.

Two Classes of Mechanics.

The dealer knows at all times how many working hours there are in a shop. He knows how many working hours are sold and he knows how many working hours for which he receives pay and it is a very simple matter for him to detect any increase in the number of wasted hours, such as are involved on a job being turned back by the tester as being not properly done, or a job brought back by the customer because work was not properly done; therefore, it is a very simple matter for the service department to keep track of the shop.

There is another variation in standard practise which means considerable in the efficiency of the shop and that Bishop, McCormick & Bishop, Inc. designate as machine shop practise. Every one in the trade knows that there are two classes of mechanics. First, machinist mechanics. Second, ordinary or automobile mechanics. A machinist mechanic is a mechanic who is graduated from machine shop practise and is, therefore, thoroughly trained in fine work, such as fitting of bearings, etc. They have found that they could introduce new elements of efficiency by having all motor work done in the machine shop by machinist mechanics. On jobs of this kind the automobile mechanics become merely assemblers. This introduced considerable saving in time and also an added element of surety that had not existed before.

Incoming and Final Tests of Cars to Be Repaired.

The service department of Bishop, McCormick & Bishop, Inc. does not rely on the customer's report on certain irregularities to be adjusted or units to be repaired, but in every instance they give the car their "incoming test" to ascertain whether there is anything other than that reported by the owner which should have attention. All the information of this "incoming test" is incorporated in the tester's printed blank form, here reproduced:

Form No 38
BISHOP, McCORMICK & BISHOP, INC.
Brooklyn, N. Y.
Inspector's Report.
Incoming Test.

No.
Speedometer.
Record, 9690. W. E. McGuirk.
Motor No. 102.259. 1567 President St.
License No. 27,654. Tel. Bedford 5842.
Inspector, Monahan.

Grind valves.
Tighten starter chain.
Equalize foot brakes.
Tighten drag link (2 ends).
Tighten steering at connection.
Put new felt washer in right front wheel.

The process of testing is very simple. Their tester rides out with the customer and he shows the tester the trouble of which he complains. As soon as the inspector has located the trouble he spends the balance of his time on the test in the attempt to discover if there is anything else wrong with the car, and when the car is brought back to the service station he also examines it, going over it very thoroughly. He then makes a complete report of anything he finds wrong to the service clerk, who takes the case up with the customer on the basis of the inspector's report. Here is a very important step and safeguard in their standard practise system. It quite frequently develops that the customer does not want anything done to his car beyond the correction of the particular condition he designated. Of course they follow the

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customer's wish in this respect, but the tester's report is affixed to the repair job ticket. It also quite frequently happens that when the final test is made, which is for the purpose of showing the customer that the condition of which he complained has been corrected, that the customer will call the final tester's attention to some condition in the car which did not exist when the car was brought into the service station, and it is invariably developed by reference to the original tester's report that the customer's attention was called to this condition and that he refused to have the work done; or it may be that an interval will elapse and then the customer will come in and bitterly complain about his car on account of the trouble he is having, and reference to their tester's record will show him that he might have avoided the trouble if he had permitted them to do some minor precautionary work to which their tester had called his attention.

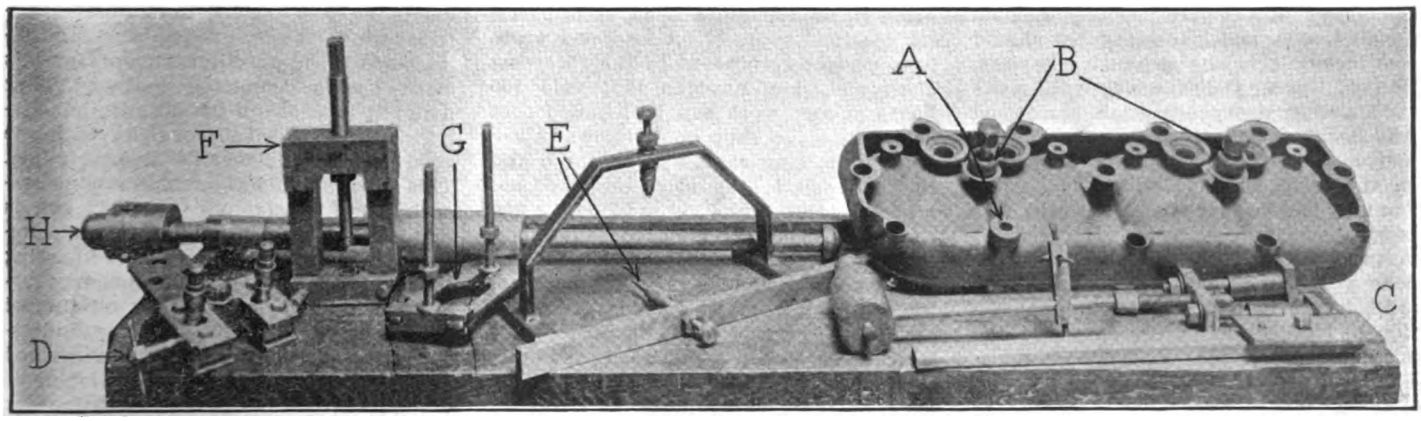
There are several other checks of similar kind which Bishop, McCormick & Bishop, Inc. keep on all the cars they have sold, which are of great assistance in the handling of unreasonable complaints. These are not methods that they could allow to be published, but they declare that it is an easy matter for any dealer to develop ways of deciding, as for instance, when a customer comes back to him and says he has run his car only 200 miles, whether he is not slightly mistaken in his statement and has not, in fact, run it 1500 or 1800 miles. Bishop, McCormick & Bishop have found that it is only necessary to catch a customer wrong once in a statement he has made in order to make him an entirely satisfactory and well behaved customer thereafter. By this they do not mean that they are looking for trouble of that kind, but it almost goes without saying that it is utterly impossible to be fair to everyone in service work unless some standard of judgment of complaints is established, nor is it wise to let one or two unscrupulous owners spoil your faith in hundreds of owners who ask only what is fair and right and with whom the carrying on of any business transaction is surprisingly simple and easy.

Saving Time and Labor with Special Tools.

Bishop, McCormick & Bishop, Inc. are enabled to cut down the time on various operations of repair work by using a number of special tools of their own design. This is another angle of their efficiency by which they have been enabled to adopt standard practise on various operations. The utility of these special tools is sufficient to attract the admiration of all practical automobile mechanics, as the possibilities of larger profits through the use of special tools are so much greater. This can be illustrated by a valve grinding job. Let us assume that a valve grinding job done by the hand method costs $8, that the time consumed in grinding these valves is about six hours; having established this rate of $8 for the job, by way of comparison, we substitute an electric valve grinder and cut the grinding time from six hours to less than one hour, but leave the charge to the customer the same. On the basis of this greatly increased efficiency the service department of Bishop, McCormick & Bishop, Inc. argues that if their rate per hour were $1, five hours of labor would be saved, although an additional item of expense would be added by the use of electric current and the wear on the valve grinder. Then they assume, for example, that the cost of grinding a set of valves would be $2, which leaves three hours, or $3, saved on the job, which can be expended toward paying for the valve grinder, and as soon as it is paid for the dealer can either keep the extra profit himself or he can share it with his workmen or divide it between himself and his customers. They hold that this phase of shop work is an angle of efficiency in standard practise, which lends a charm to service work which never existed before. Its possibilities are tremendous. The proper wrench for a particular operation will often save 15 minutes to an hour's time in the handling of it. The time and labor saved by using the proper appliances for lifting out bodies, jacking up rear axles, lifting out motors and delivering them to the machine shop make up an economical efficiency that increases the profits of the dealer.

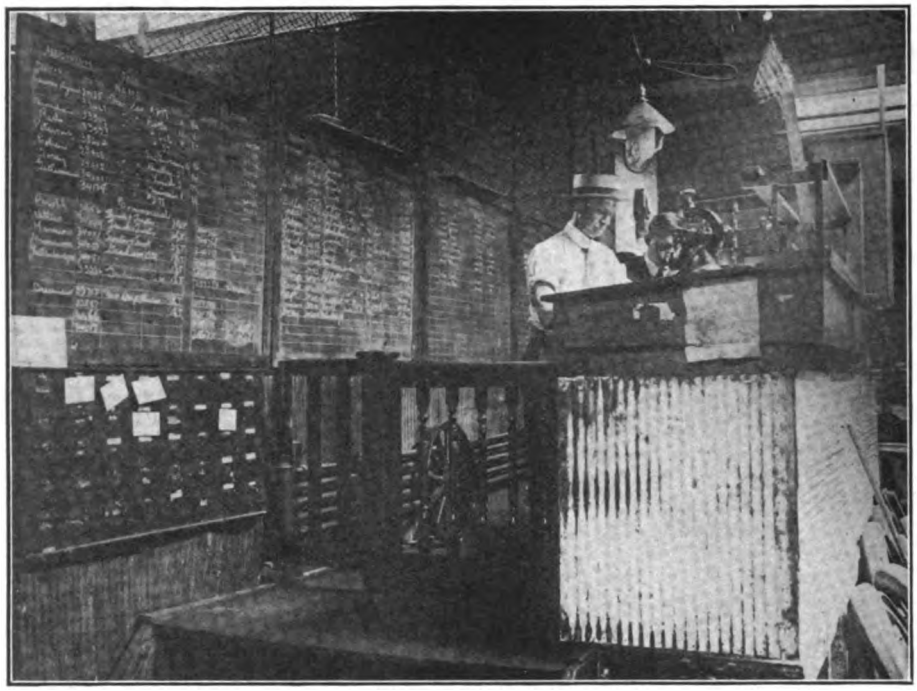
The special tools described below were designed and perfected under the direction of the capable service manager of Bishop, McCormick & Bishop, Inc. Joseph Kenney, who is a practical machinist and has been connected with the automobile business for the past 12 years. Nearly all of these tools can be used on repair work on nearly all makes of cars:

1. Gauge for measuring the oil dips on the connecting rod and the oil level and the combination splash and force feed system used on Dodge Brothers car.
2. Another tool that has saved a great deal of time in cases where the outer bearing race of the drive pinion bearing has broken and it is impossible to extract it in any other way.
3. A special vise to hold the bearing cap or connecting rod while the bearing is being scraped. When the ordinary type of vise is used for this purpose it is quite likely, unless the mechanic is exceedingly careful in tightening the vise sufficiently to hold the cap, it will also press it out of shape. This vise contains two pins, which fit into the holes in the cap or connecting rod and hold it in this way.
4. There is another tool, a jig, devised for use on the earlier cars where bolts were used instead of studs; quite frequently the thread in the cylinder that the bolt fitted into would become stripped. The jig is used to redrill and retap these holes.
5. A special yoke puller to pull the universal yoke off the transmission shaft.
6. Another special tool is a clutch spring compressor to hold the spring until thrust plate has been removed or replaced.
7. Another tool that has been exceedingly helpful is a gauge to test the trueness of the brake drums in adjusting brakes. This is one job that is quite likely to be poorly done in most of the shops.
8. In connection with brake work they also use a jig to hold the brake lining so that it can be drilled, countersunk and riveted in one operation without any danger that the brake band will be hammered out of shape, which is quite likely to be the result if this work were



Special Tools: In the Upper Right Hand Corner Is the Special Jig Used to Retap and Redrill the Cylinder Bolt Holes; A, Removable Guide for Drill; B, Sleeve and Taper Stud to Center Jig; C, Tool Alongside Cylinder Head Used to Test Brake Drums to Ascertain Trueness; D, Special Vise to Hold Connecting Rods and Bearing Caps; E, Gauge to Measure Oil Dip on Connecting Rods and Oil Level in Pan; F, Press Used to Press Out Old and in New Bushings in Steering Arms in One Operation; G, Clutch Spring Compressor; H, Special Puller Tool Used for Pulling Out Outside Bearing Cup and Torque Tube.

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The Foreman's Blackboard, Showing Repair Jobs Under Way.

done on the vise.

9. A special set of clamps to hold the valve springs compressed, thus eliminating the necessity for valve lifters.

10. Another time saver is an alignment rod for quickly lining up front wheels.

In addition to these special tools of their own development, they use Weaver jacks for rear axle work, special adjusting stand for motor work, which holds the motor in the position desired, electric valve grinder and drills, jacks, clamps and brackets for the removal and installation of motors, traveling hoists and portable hoists and every other form of standard equipment that will save time and labor.

All tools and equipment are given out to mechanics on checks and a report is immediately made of any damage to them, so that they can be replaced immediately or repaired.

There are other possibilities of modern methods and equipment, which do not necessarily mean increased profits so much as they are safeguards to already existing profits. This side of shop efficiency, of course, should include proper testing and inspecting, but should also include accurate measuring devices, gauges, jigs and dies which will make certain that every operation performed will be absolutely correct and satisfactory, so that there will be no comeback on the shop, because whatever system you may use in your shop the work must be properly executed, and if it is not properly done the first time it must be done over a second or even a third time until it is right. That is the unquestionable obligation of the dealer to the customer.

The Utility of the Foreman's Blackboard.

Since in their system they have broken each job into the smallest possible component operations, they frequently find that the small individual operations run through a great many jobs; for instance, the process of removing a cylinder head on a Dodge Brothers car is exactly the same in a carbon cleaning job as in a valve grinding job, therefore, the start of these two jobs is identical. Also the operation is the same in the examination of the piston rings, etc., and since the total time of the small operations on a job makes up the total time of the job itself, the minute a job is received they know three things about it: First, the nature of the work; second, the average number of hours the work should take; third, the charge made for the job. Consequently, in the handling of the work in the shop they have rigged up behind the clerk's desk several blackboards that are ruled to show: First, the job number; second, the location of the job, for every space about the shop is numbered; third, the customer's name; fourth, the mechanic's name; fifth, the time and date at which the job was started; sixth, the time and date at which it should be finished. To illustrate the working of the blackboard, if the shop employs 30 men eight hours a day, it has 240 hours of labor a day to sell. If, on the other hand, it is carrying over 140 hours of uncompleted work, it is perfectly apparent to the receiving clerk and shop foreman that only 100 hours of new work can be handled that day. Thus the shop clerk knows in advance how long each job will take and the shop clerk, the shop foreman and his assistants know in advance when each job should be finished; therefore, the question of promising work and delivering it on time is greatly simplified, for the shop foreman and his assistants have only to glance at the board to know which jobs should be finished, and it is their duty to see that these jobs are finished on time, both to save the customer from disappointment and the shop from the loss of a job. Therefore, it is the practise of the supervising mechanics and foreman to get around to every job at least an hour or two before it is due to be finished, and if there is any likelihood that the mechanic will be behind on his schedule to finish the job, then they must turn in and help him to get it finished on time.

This system of blackboard schedule keeps constantly before the responsible heads of the shop their obligations to the public and the firm, and it is a rare occasion for anyone to disappoint on the scheduled delivery of a job and a very rare thing for the firm to have to stand a loss on a job because an excess of time was consumed in the work.

Above were mentioned the inspection points in each job. They are generally placed on each job ticket (see illustration, Fig. 1), so that an inspection may be made before the work is covered up. For instance, in cleaning carbon there is an inspection required as soon as the carbon has been cleaned off and the valves have been seated. This inspection is to make sure that the cleaning has been properly done and that the valves do not need regrinding. If the valves should need regrinding it should unquestionably be economy for the customer to have it done while the head is off. Bishop, McCormick & Bishop have proved to their own satisfaction that these inspections have saved thousands of dollars to them and their customers in the course of a business year.

The Electrical Department.

The electrical department of the service station of Bishop, McCormick & Bishop, Inc. is installed in a room separate from the main work shop. This department is a particular example of their specialization. It was formerly their practise to have any one of several mechanics undertake electrical work, but they found that much better work could be obtained by having the best man specialize on that kind of work, because electrical work requires special equipment and machinery, from which satisfactory results cannot be obtained if six or seven men are working with it and the responsibility for its working efficiency is divided, nor can the same standard of uniformity of work be obtained under such conditions. On a standard practise it requires the same flat rate system throughout all departments, so they decided to eliminate electrical work from the repair shop and established a separate department for this class of work, completely equipped. They found it possible to handle all the electrical work that comes to them with one good electrical mechanic and a helper. This department has brought about several very satisfactory results; one is that they retain a profitable revenue-producing department, instead of passing the work to some outside concern; another advantage is that they eliminated for customers all the waste time and expense involved in sending out work and getting it back promptly. A car can be brought into their service station for combined motor and electrical repairs and the electrical work can be going on in the electrical department while the other work is being proceeded with in

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the repair department, and thereby there is very little chance of any holdup in the delivery of the work. They are enabled by this policy to keep within their own organization a man thoroughly capable of handling every electrical difficulty that may arise in the plant or in the use of their own cars and electrical equipment. In this department they handle all kinds of work on generators, magnetos, electric horns, etc., but they do not undertake any battery work, as the Willard Storage Battery Co. has an established service arrangement which gives the owner of a Dodge car free service in having his battery registered as soon as he receives his car and thereafter inspected at frequent intervals.

The C. O. D. Repair Order Form.

The size of this blank form is 11x8⅜ inches and is in triplicate, with two holes punched at the left for loose-leaf filing. The heading of the firm and "C. O. D. Repair Order" are the lines prominently displayed at the top in the centre. To the left of this main heading are these lines and blanks: Speedometer Record, Motor No., License No. To the right are No. R., Date, Name, Address, Telephone. Along the left side of the blank space for the particulars of the order are printed the conditions reproduced below, which the customer assumes when giving his order for work, and at the bottom is this line, "I hereby authorize the above work subject to the conditions printed on the face of this order blank," followed by a blank line for the customer's signature. On the back of this original order is a ruled form headed "Actual Working Time," with the repair order number duplicated. This original order form goes to the billing department to figure the total time charge, together with the additional charges for material and parts which are recorded in a ruled form on the back of the second sheet of the repair order. On the second repair order sheet the main heading is eliminated, with this substitution: "The repairs, as per instructions on original copy of the order, are hereby accepted as complete and satisfactory and the charges for same, amounting to $....., have been examined and approved by..... Customer. Date ..... 191..." On the second sheet, occupying the space used for the conditions on the original sheet, are these lines: Inspected by, received by, promised for, with blank lines for the day and time; foreman's signature, final test by, with blank line for tester's signature, delivered by and blank line for signature of man who delivered it.

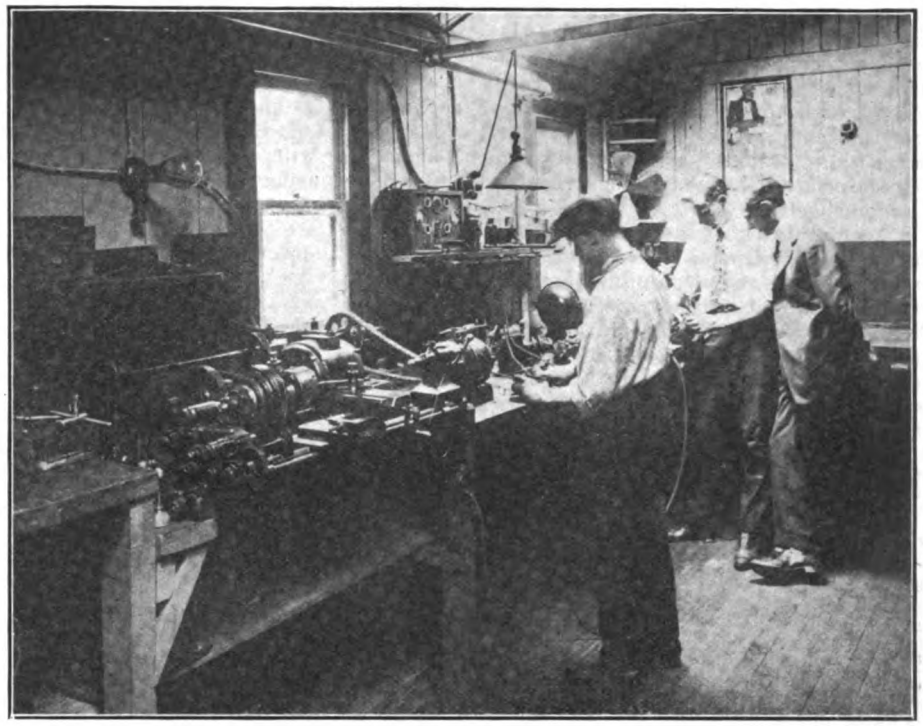
Conditions Printed on Original Repair Order.

All repair work is payable in cash on delivery.

All orders must be explicit, clear and definite.

Telephone orders are accepted only at customer's risk.

Promises made as to the delivery of work are dependent on conditions beyond our control. It is expressly agreed that this job is not to be delivered until it is fully completed as ordered.



The Completely Equipped Electrical Department.

Car must be removed immediately upon notification that work is completed or the car may be placed in storage at owner's expense.

It is further expressly agreed that Bishop, McCormick & Bishop, Inc. shall not be responsible for loss by fire or for loss or damage to cars, parts, articles or equipment, loose articles, furnishings or accessories by theft, accident or otherwise, unless a specific agreement to that end is made in writng, nor for detention or delay in delivery of cars, nor for consequent damages or loss of use of said car however caused. The receipt of the car at any time by the owner or his representative shall constitute a waiver of all claims for loss or damage thereto.

Cars are examined, tested and driven by our men solely at owner's risk.

Remove your switch key when you leave your car.

The third sheet of the repair order is of Manila cardboard and has only the heading of the original order sheet printed on it, and below this, blank space in which is duplicated the particulars of the repair job. The first sheet of the repair order is printed on golden rod bond and for the second sheet white bond paper is used. The object of the third sheet printed on Manila stock is that it is used to place on top of the other two sheets and forms a cover as well as a summarized index, for ready handling and reference when placed into the loose-leaf file.

The C. O. D. repair order form is simple and readily understood. The customer reads the conditions under which the firm accepts his order and by his also agreeing to these conditions there will be no misunderstanding on that score when the work is completed. The customer understands in advance that the terms are strictly C. O. D. and when he comes to take away the repaired car he signs the acceptance of the job and price as satisfactory and pays his bill on the spot, with all misunderstandings as to what he ordered and all chance for complaint about the charges eliminated.

Other Forms That Make Up the System.

They use a simple repaired car release form, which is signed by the service manager and authorizes the foreman of the shop to release the car.

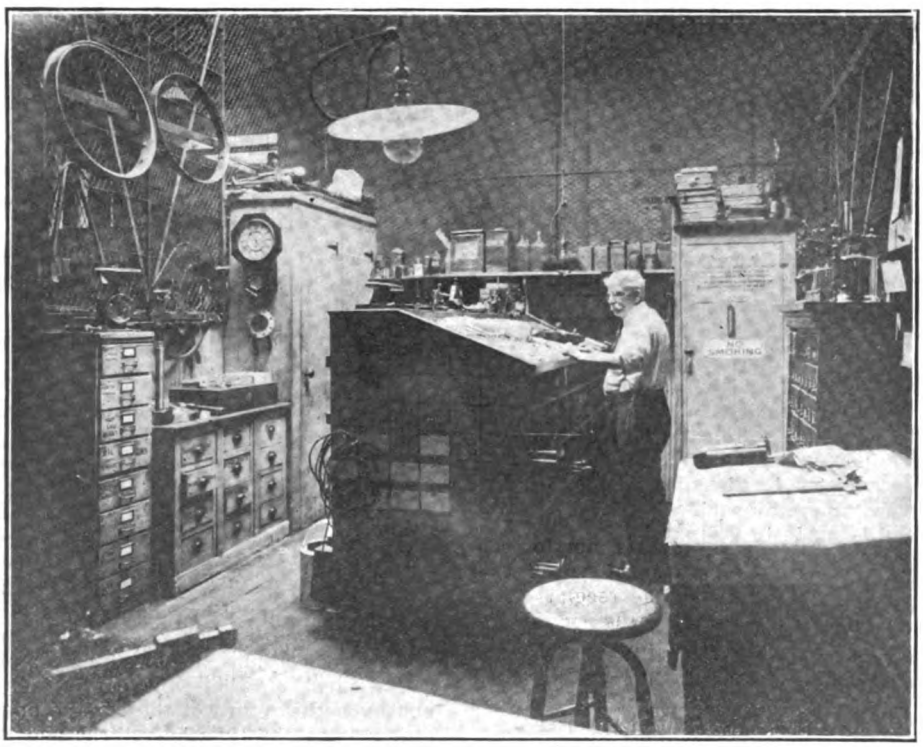
Their car record form is used to keep track of the movements of the cars they are operating in their own service. It is arranged so that they time the start of the car from their service station and the report contains at that time simply a statement of where the car is going, and upon the return of the car the operator stamps the time he returns and reports where he had gone, and, if possible, what streets he passed over. This may seem needless detail at first sight, but Bishop, McCormick & Bishop, Inc. have frequently found that where a great number of owners are operating on their dealer's license plates, that law suits may be avoided, so far as they are concerned, through their ability to eliminate their cars from having been in any accidents which their car records do not show. This form contains a space for a report of anything that happens and their men know that the report of an unavoidable accident will not get them into trouble with their employers and that it is necessary that the firm should have such a report in order that they can carry out their function under their insurance policy.

They use a requisition for parts or outside repairs, which is made out by the mechanic before starting work on any particular job, so that he will have immediately available every part needed on the job. Outside repairs cover such

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items as radiator, tire and body repairs and similar work they do not do in their own plant. These are all ordered from the parts department. In the sale of parts they use the ordinary triplicate form of cash ticket and a much larger form of charge ticket, because their charge sales of parts are invariably to their associate dealers and they require a larger sheet.

In keeping track of their stock record they use the perpetual card inventory system in which they establish the maximum and minimum supply of each part. When they have sold down to the minimum they immediately order up to the maximum. In that way an adequate stock of parts of all kinds is continually maintained. The form is ruled so that in the left column they receive, in the middle column they balance, and in the column on the right they deliver; therefore, it is a constant process of subtracting the right column from the left in order to show the balance on hand. These records are handled exclusively in the parts room by a clerk who has no other function than the maintenance of the stock records and making out requisitions for supplies to bring the parts department up on any particular part, from minimum to maximum. They also use a simple bin card to check each compartment or shelf in the parts room.



Section of the Parts and Supply Department.

They also have a requisition form used by all departments in requesting the purchasing department to order for them anything that they may need for their departments. In fact, their entire system is the most complete and practical the writer has ever seen.

Bishop, McCormick & Bishop, Inc. have 140 employees. The members of the corporation are: Eli H. Bishop, president; Burton T. Bishop, vice president; John McCormick, Jr., treasurer; Clifford M. Bishop, secretary, and John McCormick.

Editor's Note: In the August number a very interesting article on the used car and truck and commercial vehicle departments of Bishop, McCormick & Bishop, Inc. will be published. Their methods of using extension units with the Dodge chassis and the system they use to regulate their used car department will be described and illustrated in detail.

"GETTING MORE MILES FROM YOUR GASOLINE."

The above caption is the title of a booklet issued by the Eccolene Co., Detroit, Mich., manufacturers of Eccolene, a preparation which is mixed with gasoline to increase its qualities of combustion and improve engine efficiency by the practical elimination of carbon.

The manufacturers made a test of Eccolene, using 10 new six-cylinder cars, which left the factory at Detroit and were driven to New York City. At Bellevue, O., Eccolene was added to the gasoline and used for the remainder of the trip of 651 miles. The results of the test are presented as follows:

From April 24, 1918, 8 a. m., to April 26, 1918, 9 p. m.:

ECCOLENE TREATED GASOLINE.

Car No.	Gasoline Consumed	Miles Per Gal.
1	59½	12.6
2	50	15.6
3	55	13.7
4	53	14.2
5	51	14.8

Average miles per gallon.....14.2
Gasoline consumed.....268½ gallons

CARS USING PLAIN GASOLINE.

6	75	10
7	62½	12
8	56	13.4
9	68½	11
10	64	11.5

Average miles per gallon.....11.5
Total gasoline consumed....326 gallons

Gasoline saved on trip by use of Eccolene—58 gallons.

Increased mileage—23.4 per cent.

Cost of Eccolene, 3 1/3 quarts at $7 per gallon—$5.83.

Saving in gasoline, 58 gallons at 26¼ cents—$15.25.

Saving less cost of Eccolene—$9.42.

Piston of cars using Eccolene were almost free from carbon; the others were considerably carbonized.

The Edward A. Cassidy Co., of New York city, has been appointed distributors of Eccolene for the entire country.

PROGRAM FOR SEMI-ANNUAL MEETING OF THE A. G. M. A.

An interesting program is being arranged for the semi-annual meeting of the American Gear Manufacturers' Association, which will be held at the Onondaga hotel, Syracuse, N. Y., Sept. 19, 20 and 21.

A portion of the program has been announced as follows:

"Priority" by Charles A. Otis of the priority committee.

"What Is the Possibility of Women Becoming a Permanent Factor in the Gear Industry?" W. H. Diefendorf.

"Trade Acceptances," C. E. Crofoot.

"The Outlook of the Steel Supply," C. E. Stuart, secretary and treasurer of the Central Steel Co., Massillon, O.

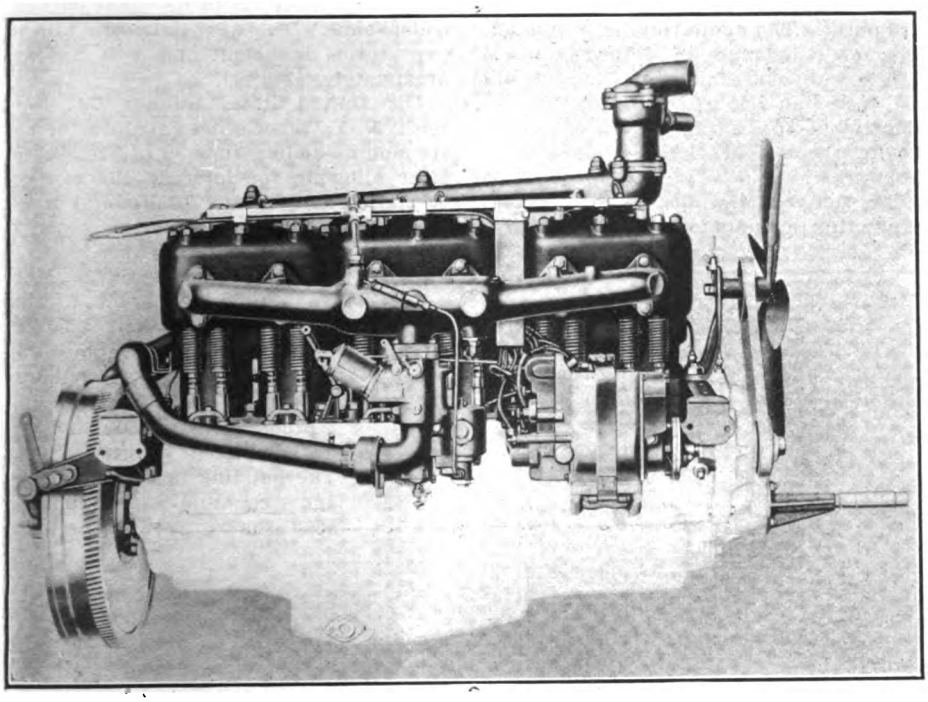
THE GEORGE D. BAILEY CO. WILL BUILD A NEW PLANT.

Slightly more than a year ago the Geo. D. Bailey Co. of Chicago was organized for the purpose of marketing the Bailey ball thrust bearing for Ford and Chevrolet 490 cars. This bearing was to replace the flat thrust washers that take the gear thrust at the left side of the differential and which because of their flat surface produce friction and wear thin, causing the gears to unmesh. The great popular demand for a bearing of this type is evidenced by the fact that in just one year's time the Bailey company has been forced to move from their previously small quarters and build its own modern factory.

The new plant, located at 4500-06 Ravenswood avenue, Chicago, is equipped with $75,000 worth of the latest type of machinery for manufacturing not only the Bailey ball thrust, but the new Bailey product, the R C magneto coupling for trucks, tractors and passenger cars. The arrangement of the new factory is such that the company can turn out its products economically and on the highest efficiency basis, placing it in a position to manufacture other products which it has in mind.

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Pierce-Arrow "Series Five" Passenger Car Model Has Dual Valve Engine



Intake Side of the Pierce-Arrow 48 Horse power Dual Valve Six-Cylinder Engine.

The Pierce-Arrow Motor Car Co. of Buffalo, N. Y., has earned and enjoys a reputation in the motor car industry that has given its product of both passenger cars, as well as trucks, singular distinction throughout the world. Pierce-Arrow automobiles have been developed along tried lines and changes in body lines or mechanical design have been made only after careful and exhaustive tests, a fact which makes any announcement of the incorporation of radical changes in their models take on exceptional importance in the industry and is a matter of great interest from an engineering viewpoint as well.

With these facts in mind it was natural to expect that the announcement of the new Pierce-Arrow "series five" with dual valve six-cylinder engines was accompanied by the statement that this type of engine was being adopted after long and thorough tests and trials had established its efficiency, as the Pierce-Arrow policy of building the best possible motor car and then fixing the price is adhered to strictly.

Production, however, of this type of engine has been confined to the 48 horsepower motor, as the manufacture of the other two, the Pierce-Arrow 38 and 66 horsepower, have been discontinued until after the war.

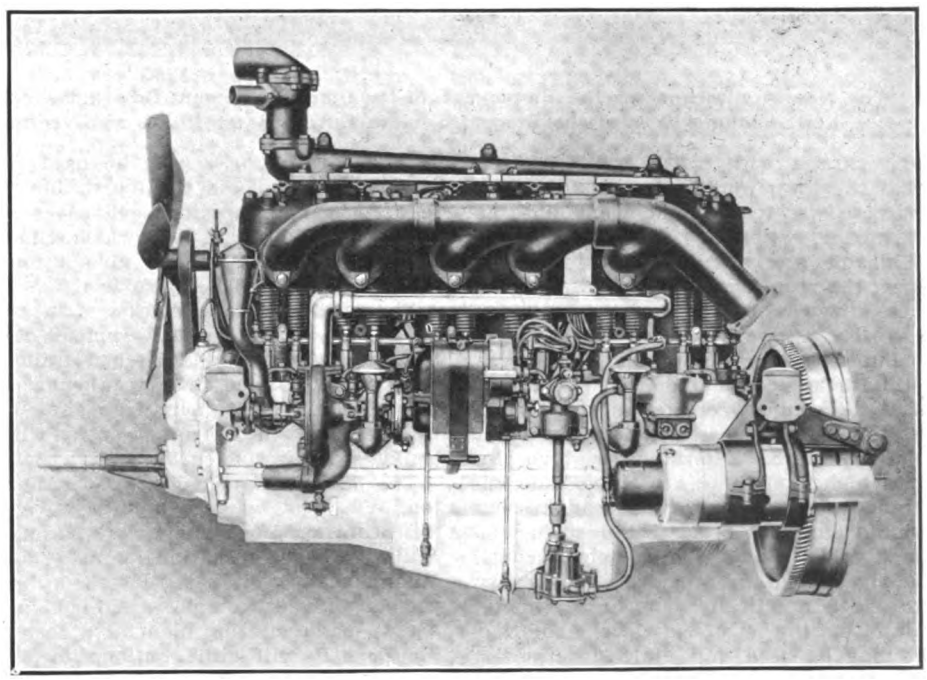
"The tendency today is to demand better direct drive performance from passenger cars than ever before," the announcement states. "It therefore has become necessary to obtain the utmost efficiency from our engines. The Pierce company have been experimenting for years in order to improve the horsepower output of their engines. They have built various types of six, eight and 12 cylinder engines and the result of these experiments has been to convince us more than ever that for passenger car requirements the six-cylinder engine is preferable to any other type.

"The greater power developed in some of the above engines, especially at the higher speeds, indicated that this was due almost entirely to the large sized valves employed compared to cylinder volume, this insuring a very high volumetric efficiency. In order to equal this condition in our 48 horsepower engine with its 4½x5½ cylinder, we found that it would be necessary to use a valve three inches diameter with a lift of three-eighths inches. This is as high a lift as it is possible to use and retain reasonably quiet valve action with large diameter valves. This size of valve is, of course, prohibitive because of noise due to the heavy spring pressure required, and the tendency to warp out of shape. The standard practise is not to exceed with single valves, a throat diameter half the cylinder bore—this would give a valve 2¼ inches diameter for our 48 horsepower engine. This is practically the size we have been using in the past for this engine. We did all we could to obtain more power from this engine with this size of valve, but without success, and we decided to try double inlet and double exhaust valves in this same sized engine. These valves are 1½ inches diameter in the throat, with three-eighths inch lift, giving the same area as a three-inch diameter valve with three-eights inch lift.

"With this arrangement of valves on a T head cylinder it was necessary to adopt detachable heads. The results we obtained in increased horsepower and speed exceeded our anticipations.

"We also found the engine ran cooler —the valves being so small warped less, and therefore seldom require to be

(Continued on Page 49.)



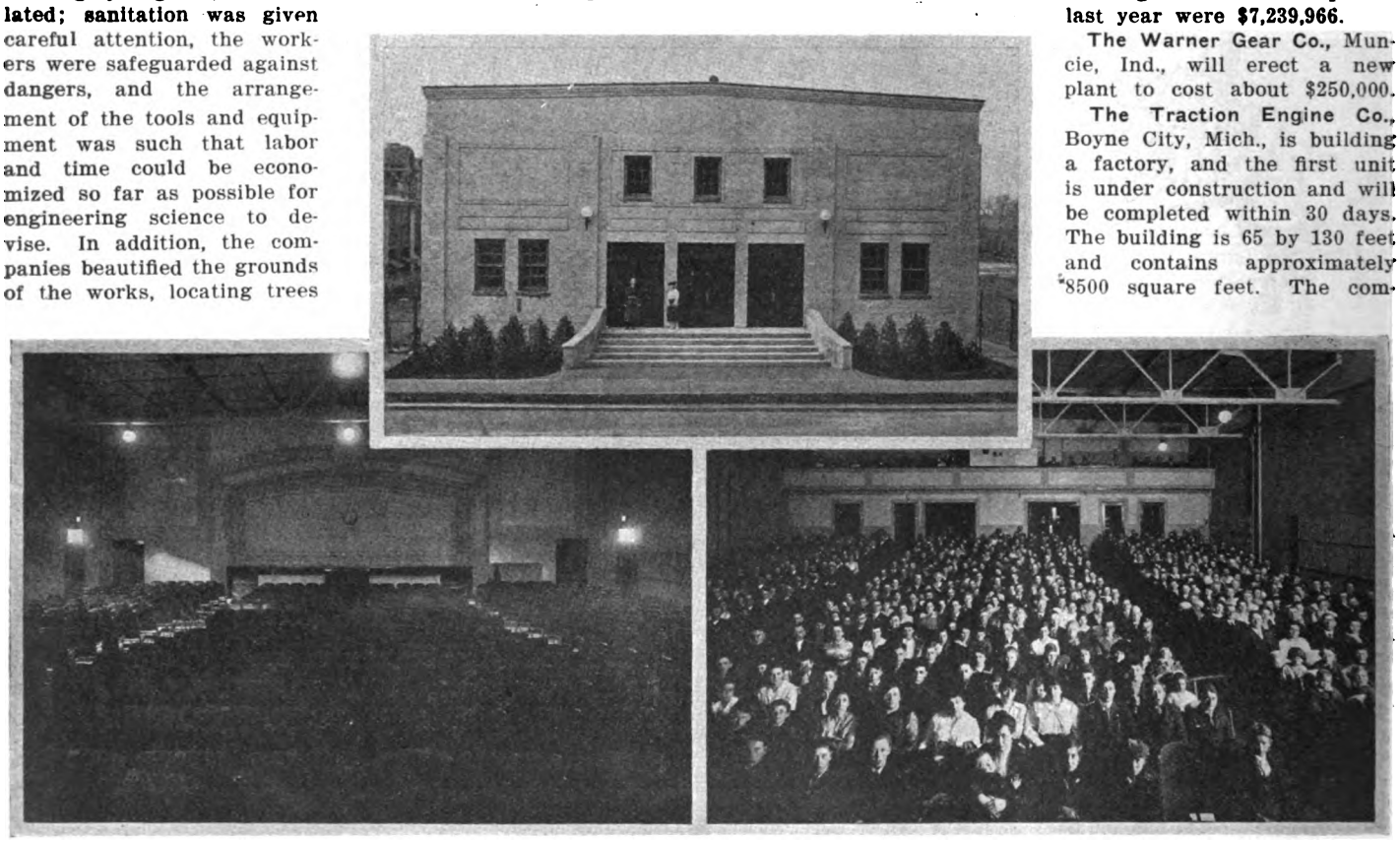
Exhaust Side of New Pierce-Arrow Power Plant, Showing the 12 Valve Springs.

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Reports of Activities In the Motor Industry

The Clark Equipment Co. plant at Buchanan, Mich., which is designed to have high industrial efficiency, was originally operated by two concerns, owned by the same interests, and when the units were designed one of the main objects of the owners was to afford every condition and facility that would be essential to the convenience and comfort of the employees, as well as insure the largest degree of manufacturing productivity.

The buildings were constructed to be thoroughly lighted, heated and ventilated; sanitation was given careful attention, the workers were safeguarded against dangers, and the arrangement of the tools and equipment was such that labor and time could be economized so far as possible for engineering science to devise. In addition, the companies beautified the grounds of the works, locating trees and shrubs, with walks and drives so that the lawn would be protected. The purpose was to have the plant quite as attractive without as it was within. While the works have been expanded to meet the requirements of increased business, the environments of the buildings have been preserved.



The New Auditorium for the Employees of the Clark Equipment Co., Buchanan, Mich.; Above, the Front Entrance; at Left, Looking Toward the Stage from the Entrance; at Right, an Evening's Audience, Looking from the Stage.

But the welfare of the employees was still further considered, with the result that the company erected an auditorium at the plant that is in effect a part of the structures. Externally it is two stories high, and there are three wide entrances at the front which lead into an auditorium that is 86 feet deep and 56 feet wide, having a complete stage, amply lighted and provided with scenery to meet practically any requirement. Half of the floor is level, so that it may be used for athletic purposes. There are seats for 625 persons. Besides, there are retiring rooms for the men and women and the usual apartments required in such structures. The building is well lighted and ventilated and the furnishings are artistic. Included in the equipment is a moving picture outfit. The auditorium is now available for gatherings of different kinds, with weekly entertainments, one of the features being display of moving pictures educational in character, all of which are for the benefit of the employees of the works.

The McCord Mfg. Co., Detroit, Mich., is erecting a four-story addition to its plant. Three stories will be used for factory purposes and the fourth for offices. The new structure will cover an area of 134,000 square feet, which, added to the present plant, will give a total floor area of 319,000 square feet.

The Olds Motor Works, Lansing, Mich., has received a government contract for 2100 portable kitchen trailers for aviation service. New equipment is being installed for manufacturing the trailers and the turning out of the trailers will be started by Sept. 1.

The Reliance Motor Truck Co., Appleton, Wis., has received a large government contract for machine work on large calibre shells. Additional tools and other machinery is being installed. The company has just completed and equipped a new manufacturing plant at a cost of $75,000. It will still continue to prepare for a large production of commercial cars and internal spur-gear drive rear axles. Plans for another shop building are being prepared.

The Cleveland Tool Co., Cleveland, O., intends to expand and has let contracts for a large addition to its plant on Central avenue. The new structure will be two stories in height and will cost approximately $100,000.

The United States Rubber Co., New York, N. Y., reports net earnings for the six months ending June 30 of $10,242,365, after allowing for interest charges, depreciation and reserve for Federal taxes. The total earnings for the same period last year were $7,239,966.

The Warner Gear Co., Muncie, Ind., will erect a new plant to cost about $250,000.

The Traction Engine Co., Boyne City, Mich., is building a factory, and the first unit is under construction and will be completed within 30 days. The building is 65 by 130 feet and contains approximately 8500 square feet. The company manufactures kerosene-gasoline engines for tractors and trucks.

The Republic Rubber Co., Youngstown, O., has declared its regular quarterly dividend of 1¾ per cent. on first preferred stock, payable Sept. 1 to stockholders of record Aug. 25.

The Steel Products Co., Cleveland, O., will erect a one-story power house at 2196 Clarkwood road, southeast. The structure will be 45 by 70 feet and will cost $17,000.

The Oakland Motor Car Co., Pontiac, Mich., is planning to build motor trucks until the end of the war. The truck will be a one-ton model and production will begin immediately.

The Triangle Motor Truck Co., St. Johns, Mich., has appointed the following new dealers as distributors of their trucks: C. C. Wright, Owosso, Mich.; Motor Car Service Co., 424 Michigan Ave., Lansing, Mich.; Triangle Motor

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and Developments Among Parts Manufacturers

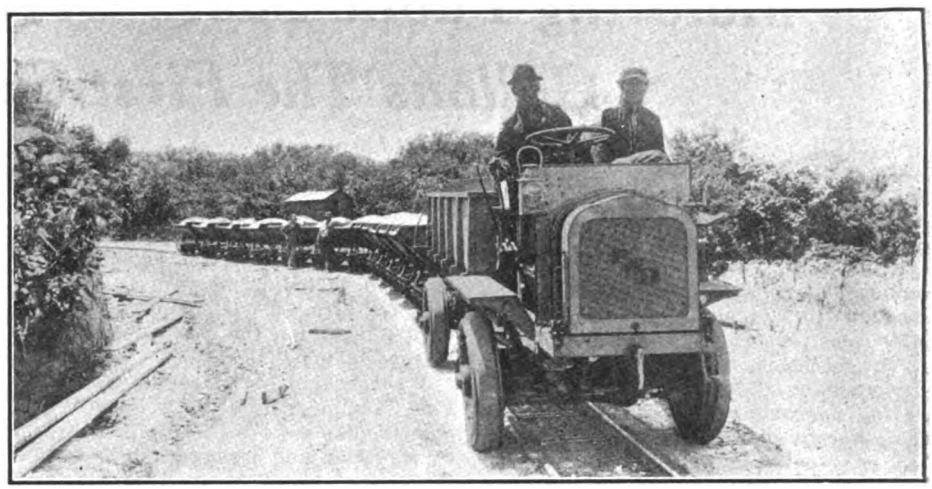
Truck Sales Co., 381 Fourth Ave., New York city.

The Dual Truck and Tractor Co., Decatur, Ill., is considering a location for a manufacturing plant and has opened offices. The company will manufacture a machine to be known as the Dual. The vice president is John K. Gumper. The machine has disk wheels mounted upon solid rubber tires, with arrangements for attaching by bolts tractor wheels, which fit over the rubber tires on the two rear wheels. It has a 38-horsepower engine and four speeds forward, and will plow in any kind of soil. The wheel base is 80 inches. With tractor wheels removed the machine resembles a roadster. The machine weighs 3500 pounds.

The Liberty Motor Car Co., Detroit, Mich., has received an order from the government for 2500 two-wheel trailers. The production of passenger cars for last month was 250 and is now averaging 10 a day at present.

The Pennsylvania Rubber Co., Jeannette, Pa., has declared the regular quarterly dividend of 1¾ per cent. on preferred stock and 1½ per cent. on common stock, payable Sept. 30 to stockholders of record Sept. 15.

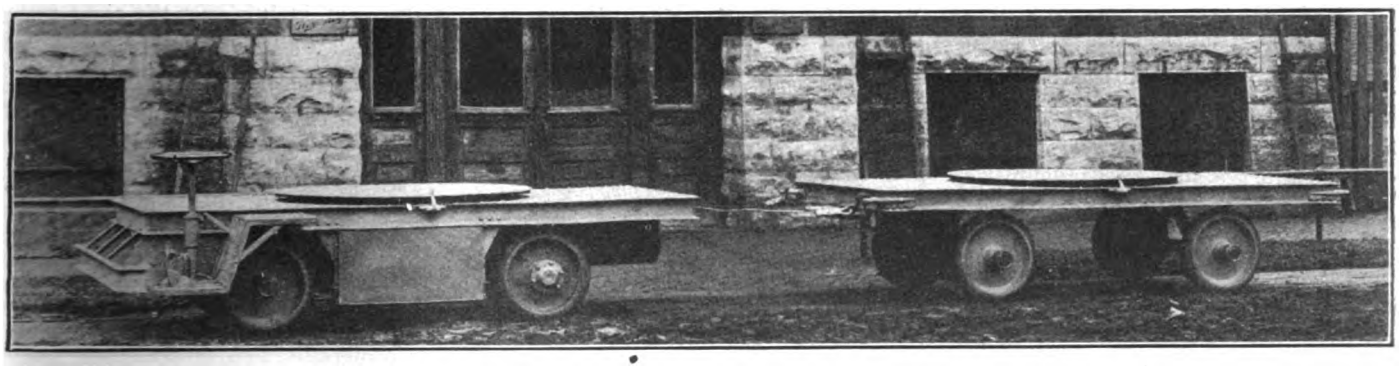
The Continental Auto Parts Co., of Knightstown, Ind., has increased its capital stock from $10,000 to $50,000, and is making extensive additions to its plant, installing additional machinery and equipment to take care of its government contracts. The company manufactures a line of shop and factory equipment and it has been necessary to greatly increase production on the Continental Motor Stand, which is being used by the Department of Military Aeronautics, the Navy, Quartermaster's and Ordnance departments and the various manufacturers now making aeroplanes, trucks and tractors for the United States government.



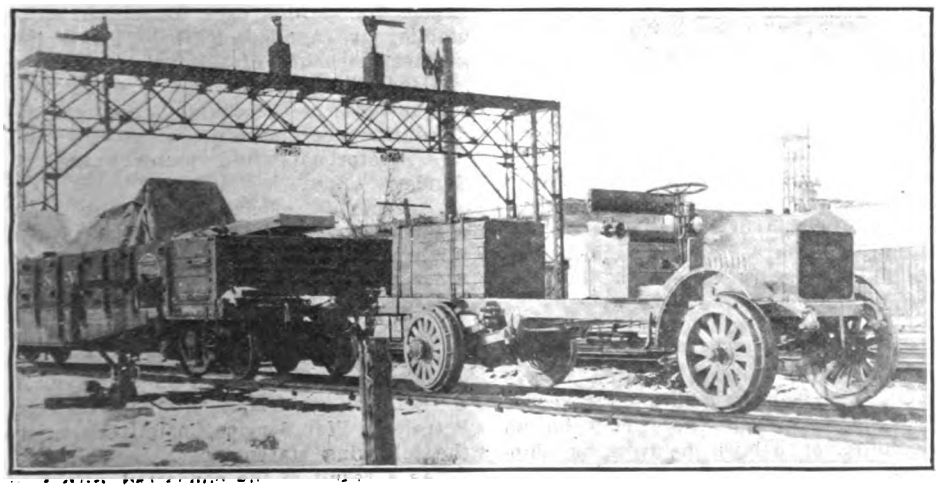
F-W-D Truck Used to Haul Trains of Side-Dumping Cars on Industrial Railroad.

The Dort Motor Co. of Flint, Mich., has increased its capital stock to $2,000,000. This represents an increase of over $500,000. The company had been capitalized at $1,500,000.

The Commercial Finance Corp. of Boston, Mass., has formed with a capitalization of $1,000,000 to finance the sale of motor trucks and tractors throughout New England and later on in other parts of the country. The board of directors comprises F. A. Hinchcliffe, Edward C. Becker and John L. Judd.



Electric Tractor and Trailer with Platform Turntables, Designed for the Use of a United States Navy Yard, for Hauling Long Structural Steel of Heavy Weight.



Selden Truck Equipped with Flanged Wheels, Used for Switching Railroad Cars.

The Briscoe Motor Corp., Jackson, Mich., is enlarging plant No. 4 with a substantial addition. The large government contracts for munitions which the company received has made it necessary to expand the manufacturing facilities.

The Motor Mercantile Co., Salt Lake City, Utah, has organized and will manufacture tractors, trucks, motor car and shop equipment and parts. A. D. McMullen is president and general sales manager and V. A. Culver sales manager.

The Cell-Beam Manufacturing Co., 1101 Bedford avenue, New York City, is marketing the Cell-Beam searchlight direct from the factory through the jobbing trade. This will permit closer co-operation between the jobber and the manufacturer.

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Sunday Gasoline Conservation In Effect Motoring Public Saves Over 7,500,000 Gallons The First Snnday

The Fuel Administration called upon motorists, owners of motor boats and truck operators to cease using gasoline for pleasure purposes on Sundays commencing with the first Sababth in September and to continue this conservation until further notice. No mandatory order was issued, but the public arose to the occasion and demonstrated its patriotism on the first Sunday by conserving approximately 7,500,000 gallons. At this rate of reduction in consumption it is believed that it will only be necessary to restrict the use of gasoline or five or six more Sundays in order to replenish the reserves to a point where conservation on this scale will not be required.

A Necessary and Practical Act of Patriotism.

There were a number of exceptions to which the restriction does not apply, as shown in the centre column on this page.

The Fuel Administration's statement, which was issued jointly by Administrator Garfield and Mark S. Requa, Director of the Oil Division of the Fuel Administration, was as follows:

"The United States Fuel Administration considers it necessary that a limited conservation of gasoline be undertaken in the States east of the Mississippi River in view of the increasing demand for gasoline for war purposes and the paramount obligation of meeting promptly and fully all overseas requirements. An appeal is made, therefore, to the people of the United States east of the Mississippi River to exercise rigid economy in the consumption of gasoline during the next few weeks as a necessary and practical act of patriotism.

Consumption of Gasoline Now at Its Highest Point.

"War necessities are being and will continue to be promptly and fully met, but this is the period of the year when consumption of gasoline is at its highest, and the increased domestic demands, together with the extensive military operations in France, have rendered necessary for a limited period the adoption of safeguards against possible shortage.

"In view of the difficulty, if not the impossibility, of differentiating between the various uses to which automobiles are applied, the United States Fuel Administration believes that the greatest measure of economy can be effected with the least intereference with the business of the country through the discontinuance of all classes of motor vehicles, motorboats and motorcycles on Sundays.

"The United States Fuel Administration therefore requests that in the section of the United States east of the Mississippi River there shall be a discontinuance of use of the vehicles above specified, including all such as are operated for hire, on each Sunday hereafter until notification that the need for such discontinuance has ceased."

A subsequent statement issued by the Fuel Administration gave in brief the objects that were to be attained by the conservation and a suggestion as to how the order should be interpreted. This statement read as follows:

"The request made by the Fuel Administration that pleasure riding be discontinued on Sundays for the present in order to conserve our supply of gasolene for war needs, was not intended to prohibit reasonable use of gasoline driven vehicles as the means of necessary transportation, where other means are not available.

"Mr. Garfield believes that the public will construe the request wisely and intelligently and will not use their automobiles for other than the most necessary purposes.

"The intention of the request is that all mere pleasure riding be eliminated, but that necessary use of the automobiles be not interfered with.

"Just what is pleasure riding and what is necessary use must be determined by the individual; keeping in mind always that we must have additional reserves of gasoline so that there may be no possibility of delays in overseas shipments.

Exemptions From Order for Sunday Gasoline Conservation

Tractors and motor trucks employed in actual transportation of freight.

Vehicles of physicians, used in performance of professional duties.

Ambulances, fire apparatus, police patrol wagons, undertakers' wagons, and conveyances used for funerals.

Railway equipment using gasoline.

Repair outfits employed by telephone and public service companies.

Motor vehicles on errands of necessity in rural communities where transportation by steam or electricity is not available.

"The United States Fuel Administration will not attempt to tabulate automobile traffic on Sundays."

The National Automobile Chamber of Commerce viewed the order with favor, feeling that it would give a further opportunity for motorists to prove their loyalty to the war programme, and expressed these sentiments in a statement issued, which in part was as follows:

"In connection with the request of the Fuel Administration for the discontinuance of Sunday automobiling, motorboating and motorcycling for mere pleasure, we are told by an official of the Fuel Administration that the restriction is expected to be necessary only a short time, probably four to six Sundays, which would provide ample increased stocks of gasoline.

Production Increased 27 Per Cent. During July.

"The production of gasoline increased 27 per cent. in July over the same period last year, but consumption increased 29 per cent.

"It was felt that, with the increasing demands from overseas, and some difficulties in transportation, a conservation plan such as outlined is necessary.

"Mr. C. C. Winningham, chief of the Gasoline Conservation Division of the Oil Division of the Fuel Administration, said it was deemed best to make this first appeal one to the patriotism of the owners, and the feeling is general that the request will be complied with by all car owners.

Automobile Officials View Order With Favor.

"After the conference between Dr. Garfield and Mark L. Requa, chief of the Oil Division, statement was made that the action was deemed necessary as a safeguard against any possible shortage of gasoline for our war needs. Because of the difficulty of differentiating between the various uses to which automobiles are applied, it is believed the greatest measure of economy could be effected with the least interference with the business of the country through the discontinuance of the use of motor vehicles, motorboats and motorcycles on Sunday.

"Automobile officials view the new order with favor because it will give a further opportunity for motorists to prove their loyalty to the war programme."

In connection with the request of the Fuel Administration that taxicabs and pleasure cars be not run on Sunday, A. C. Bedford, chairman of the National Petroleum War Service Committee, made the following statement:

"As a result of the concerted effort of

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every factor in the petroleum industry, there has been a substantial increase in the production of gasoline during the past year. Appeals for the conservation of gasoline have also been heeded. It had, therefore, been hoped that no unusual methods of conservation would be necessary. But war necessities are paramount and must be met.

"It has so happened, however, that a tremendously increased demand for gasoline incident to the increased and enlarged war activities on the part of our own army and our Allies in Europe has come at the heighth of the season of greatest demand for gasoline for consumption in motor vehicles in this country. The situation has been intensified by the unusually favorable weather conditions recently prevailing.

"This season is to the gasoline industry what the middle of winter is to the coal trade—it represents the peak-load of consumption. This period of peak-load, however, is not an extended one, and the precautionary measures now taken as a safeguard against any possible shortage of gasoline for our war programme need not necessarily be of long duration.

Not Enough Gasoline at Present for All War Needs.

"The specific scheme of conservation for the moment applies only east of the Mississippi River. Producers and refiners in the territory west of the Mississippi are now making a careful survey of the whole situation, and unless it is possible to obtain from them a sufficient supply of gasoline otherwise, it may be necessary that within the next week or more the scheme of conservation shall be applied throughout the country.

"The public should understand that the sole purpose of this conservation programme is to supply all war needs and all essentials of domestic consumption. There is not at present enough gasoline for all war needs and all domestic purposes; therefore, the less essential domestic requirements must for the moment stand aside. Under ordinary circumstances the present output of gasoline would represent more than enough to take care of the normal requirements of this country and those countries which depend upon us for their usual supplies.

"The situation is similar to that now prevailing with reference to sugar and wheat; we have enough for our own uses, but not for ourselves and our Allies, too. It is the part, therefore, of every citizen to get behind this programme as a very definite step in winning the war."

Following the first Sunday on which the conservation movement became effective, A. C. Bedford issued a statement summarizing the results that had been obtained, the figures for which were compiled at the request of the Fuel Administration and were obtained by employees of the oil companies. His statement was as follows:

"Patriotism cannot be reduced to terms of accounting, but statistics gathered from the territory to which the Fuel Administration addressed its plea for the suspension of pleasure riding in motor vehicles last Sunday in order to save gasoline, furnish striking evidence of the unswerving and unfailing popular support to any war measure.

"Generally speaking, the returns from the States east of the Mississippi, which were those affected by the request, show that the mere intimation of the Fuel Administration that pleasure riding should cease on Sunday was unhesitatingly obeyed by an overwhelming percentage of automobile owners and users.

"It is true that there was a good deal of variation in the extent of the response. In some sections patriotism, as evidenced by the almost total non-use of pleasure vehicles, swept the State; in others, the observance of the request was not so emphatic. In the latter instance the incomplete compliance with the Fuel Administration's request was perhaps due to the fact that the scope of the request was not comprehended or that the situation which prompted the administration's appeal was insufficiently appreciated. Then general result, however, must be intensely gratifying to the department which initiated this policy of voluntary effort.

"To employees of the various oil companies supplying the gasoline requirements of the territory concerned was delegated the task of determining the decrease in the volume of automobile traffic as a result of the Fuel Administrator's request. For the purposes of this test men conversant with such work were placed at key points on automobile routes of all descriptions, both in urban and rural communities in 25 States.

"A careful census was taken of all cars passing these points between the hours of 2 and 4 P. M. on Saturday, Aug. 31. A similar count was made at the same points and between the same hours on Sunday, and the difference was regarded as representing the number of cars which would ordinarily have been used on Sunday, but which were idle in respect to the Fuel Administrator's request.

"The investigation proved that the more westerly States led in percentage of reduction, Illinois being first with 95, Ohio second with 93, and Wisconsin third with 91. It is estimated that the observance of the request over the Eastern section of the country resulted in the saving of from 100,000 to 150,000 barrels of gasoline.

"The result of the test is presented below by States, the automobile traffic between the hours mentioned on both days being given in the first two columns, the columns following showing the percentage of reduction in the use of cars on Sunday and the automobile registration in each State:"

State.	2-4 p.m. Aug.31.	2-4 p.m. Sept.1.	P.C. Reduc.	Cars Reg'd.
Illinois	19,997	1,006	95	362,742
Ohio	28,774	1,952	93	415,962
Wisconsin	2,181	183	90	182,700
Dist. Col.	7,939	774	90	36,968
Kentucky	3,596	891	90	57,542
West Va.	826	107	87	34,371
Louisiana	3,269	429	87	37,600
Tennessee	10,115	1,265	87	51,900
Indiana	2,165	334	85	207,381
Maryland	6,400	989	84	61,102
Florida	2,282	361	84	42,846
Maine	906	149	83	38,439
Mass.	1,947	354	81	156,798
Alabama	3,589	668	81	44,859
Penn.	46,923	8,765	81	324,184
Conn.	8,592	1,721	80	75,900
Rhode Island	3,396	625	80	26,399
New Jersey	14,663	2,805	80	124,519
Georgia	4,750	906	80	89,481
New York	17,627	4,617	74	422,853
Mississippi	2,016	583	71	37,500
No. Carolina	906	282	68	61,946
So. Carolina	680	230	66	47,950
Michigan	6,378	2,245	65	236,981
Virginia	1,499	549	63	65,000

Will Discontinue The National Motor Car Shows During Period of the War

The National Automobile Chamber of Commerce has taken action which will undoubtedly result in the discontinuance of the national automobile shows that have been held under the auspices of that organization in New York and Chicago for the past eighteen years. The directors have voted to recommend to the members that this action be taken and there is no doubt but that the recommendation will meet with unanimous approval.

The action of the directors and the reasons therefor were made known through the following statement sent out by the N. A. C. C.:

"With a view to further co-operating with the governmental authorities in conserving labor, fuel and transportation, the Directors of the National Automobile Chamber of Commerce unanimously voted voluntarily to recommend to the members the abandonment during the period of the war of the automobile shows held annually for eighteen years in New York and Chicago.

"The makers present felt that the holding of automobile shows would be inconsistent with the patriotic obligations of the industry.

"At its previous meeting, the N.A.C.C., working with the War Industries Board, voluntarily agreed to curtail production of passenger cars to 50 per cent. of the production of 1917, and recommended that all automobile companies take on war work as rapidly as it is obtainable."

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GRAPHICS

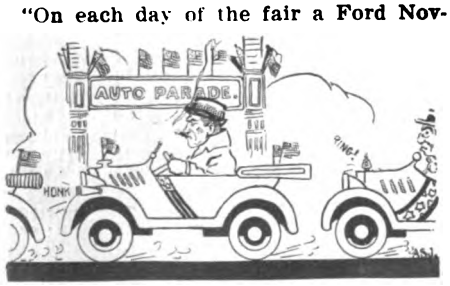


We have been constantly told that the horse was passing, but shrugged our shoulders in doubt as government statistics indicated that old Dobbin was still holding his own and eating up hay so fast that each wisp would soon have the value of an asparagus tip. All doubt about the matter has now been cleared up, as we have undisputable evidence to offer that the horse is even losing out where he made his last stand—among the country folk.

Those who in their boyhood have attended the local country fair learned of the supremacy of the horse as a feature, a fact which was also impressed upon the mind by the flaring posters showing a field of trotters coming down the stretch, that were blazoned broadcast through the countryside for weeks prior to this crowning event of the harvest season each year. Those who have these cherished memories of their youth uppermost in mind could not imagine, even with a vivid flight of fancy, that the flivver could oust the horse from this place in the limelight, yet such is the case, and the evidence is found in a publicity bill sent out by the management of a country fair in the Bay State, and from which we must infer that the officials have discerned that the horse no longer occupies the same place in the heart of the farmer as formerly, but takes second place to the admiration for the automobile.

This advertisement, which reads much the same as the old announcements, except that the word "cars" is used in place of "horse," reads in part as follows:

"On each day of the fair a Ford Novelty race will be run, governed by the following conditions:



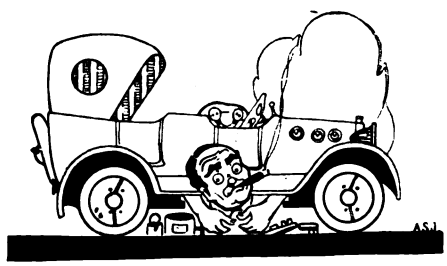
"Entries will be limited strictly to Ford Touring Cars without self-starters.

"Each car is to be driven by its owner or a member of his or her immediate family or a bona fide employee who has been in the employ of the owner for at least 30 days preceeding date of race.

"Cars to carry drivers only; cars to stand in line at wire, driver at wheel, engine killed, and at a signal driver to dismount from right side of car, crank engine, pass around back of car and mount, run around track to fourth-mile line, stop on same or back up, kill engine, dismount as before, crank engine and continue to next fourth-mile line and to the next fourth-mile line in same manner until one mile has been run.

"In addition to the above, there will be a grand parade of Ford cars around the track at 3 p. m. Thursday, Aug. 22. 1918. No entry fee will be charged and undecorated cars can participate, but it is urged that every car at least be provided with small American flags."

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Al Schwartz of Newport, Ky., is the only catch-as-catch-can automobile repairing champion of the world, and his laurels rest easily upon his brow, for he fears no contenders, having certain physical qualifications to which he owes his unquestioned supremacy and which make it unnecessary for him to suffer handicaps in doing work that the ordinary mechanic must experience. The secret of his prowess lies in the fact that he was a contortionist by profession before taking up the work of repairing automobiles, and his ability to twist himself into almost any shape to gain access to nuts, bolts and other parts beneath the car or in difficult positions enables him to do work minus creepers, pits, multi-shaped wrenches and other accessories without which the best of normal mechanics are balked and which require extra time in handling.



Women are doing their bit at home in a way to elicit the warmest praise, particularly those who have automobiles or who are capable of driving cars. They have not only formed reserve corps for operating ambulances or driving cars in emergency work, but many have turned to the practical work of helping in the distribution of foods to stabilize values and relieve the congested freight situation.

Mrs. Andrew W. Crawford, Bryn Mawr, Pa., has organized and is head of an organization composed largely of women who drive automobiles for gathering fruit and transporting it to canneries. The women volunteers are assigned to pick up fruit in baskets at certain farms and take it direct to canneries, which are notified that it is coming. Fruit is also taken direct from the farms to market or to consumers. This organization is doing a most valuable work and its operations could be extended greatly if the needed volunteer drivers were obtainable.

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The flivver is a muchly maligned and abused car, although it apparently has manifested no qualities to merit this vituperation, and at times, especially in emergencies, owners find it worthy of their highest praises. All its various virtues have been sung, from those pertaining to its economy to those having to do with its reliability, but now we have occasion to call attention to an additional point of superiority which, while always latent in its makeup, has never been called to the attention of the public. This point is its structural flexibility, a quality which was ably demon-



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strated by a jitney operator recently. This driver piloted his car with a load of passengers into a passing trolley car with such force that it took on the form of the well-known, but not melodious, musical instrument called the accordion, after same had sounded its final note. Under such circumstances the owner of the average motor car would have immediately placed a call for a wrecking machine and looked up the nearest junkman, but this driver, unperturbed over his seeming predicament, blandly asked his passengers to alight and then set to bending the divers portions of said car back into line and form again.

As he drove off with his fares, leaving the trolley car stranded, he admonished the dazed motorman as follows:

"That's the best thing about these flivvers, you can easily bend them tinto shape again."

—:::—

Although the Cadillac Motor Car Company has not built one-cylinder automobiles since the early days—1903 and 1904—it is not at all unusual for it to hear from owners who are still running these old cars.

One of the most interesting of such letters lately received comes from a



man in Washington, D. C., who says he uses his single cylinder Cadillac in his sales work among the grocery jobbers in Washington and Alexandria, Va. The car is a 1903 Model A—one of the first Cadillacs built. The owner writes:

"I am not a mechanic, but I am a 'Jack-of-all-trades,' and I keep the old box so it will run up hill and down hill and drag anybody out of a rut that I meet in one, and there have been some of them.

"Some time ago I met a party on Capitol Hill with an automobile carrying four men, and they had broken their crankshaft. I weigh 220 pounds, and I had my brother with me, who weighs 265 pounds. I pulled this automobile with four men in it, while my brother and I were in my old single-cylinder machine, and I pulled the whole business over to Anacostia with no trouble whatever.

"I took these people out over Pennsylvania Avenue, and while people cheered the old Cadillac, they joshed the fellows sitting in the big machine.

"I make it a point to help any fellow who may be broken down on the road."

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Every time you see a picture of a Japanese thoroughfare you wonder how automobiles have any room to maneuver at all, let alone how they can observe traffic laws as stringent as those in force on Fifth avenue. But according to a well-known motor car importer who has just returned from Nippon, the Japs have their own ideas of how a car and



driver should behave, and what is more, take pains to see that all foreigners understand them.

The Japanese traffic rules as translated into English and posted in Pyang Yang, Chosen Province, read as follows:

"You must drive your automobile at the speed of eight knots per hour on the city road and at twelve knots per hour on the country roads.

"In narrow place of road corner and bridge, speed slowly.

"When you see policeman throwing up his hand you must not drive in front of him.

"When you pass the corner and the bridge, ring the horn.

"When you get ahead of the passenger on foot or the cow or the horse you must ring the horn.

"When you meet the horse or the cow speed slowly and take care to ring the horn and not be afraid of them. Drive slowly when you meet the horse and the cattle; do not make them afraid and carefully make the sound. If they afraid the sound you must escape a little while at the side of the road till they pass.

"When you drive the motor car do not leave the driver seat and take care lest unexpected trouble happen.

"Do not drive the motor car when you get drunk and do not smoke on driver's seat.

"When two cars are driving in the same road, if there is another car in front of yours, you must keep 60 yards away from him, if you go ahead of him ring horn and pass him.

"When you cross the railway, wait until the other train and other cars pass through.

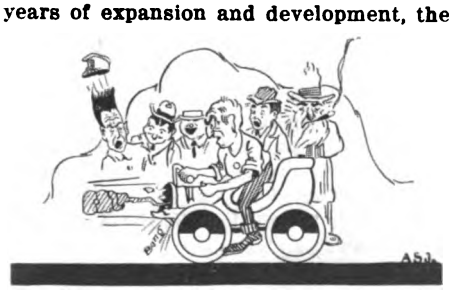
"When anything the matter with your car you go police station and tell him.

"When you want to have a driver or exchange another, you must enclose driver's address, career and age."

"SPECIAL NOTICE—You must never put overload on your automobile. The licensed capacity of your Ford car is five passengers, two in front house and three in back house."

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At the present time when the automobile industry is threatened with its first period of retrenchment after some 20 years of expansion and development, the



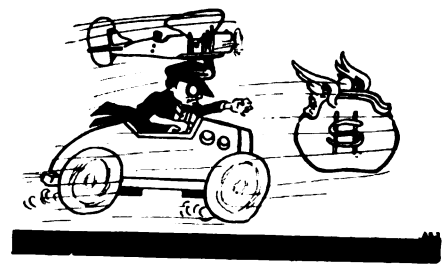
story of the first practical gasoline car manufactured takes on added interest. This story, which is told briefly by Elwood Haynes, the inventor of the car, is as follows:

"During the delay in the work of constructing the pipe line for the Indiana Gas and Oil Company at Greentown, Ind., it occurred to me that some better means of locomotion over the highways than the horse and buggy might be procured, so I accordingly laid plans for a mechanically constructed vehicle.

"In the fall of 1892 I moved to Kokomo and the following summer (1893) had my plans sufficiently matured to begin the actual construction of a machine. I ordered a one-horsepower marine upright, two-cycle, gasoline engine which weighed 180 pounds.

"When the gasoline and battery connections were installed, the motor, after considerable cranking was started and ran with such speed and vibration that it pulled itself from its attachments. Luckily, however, one of the battery wires was wound about the motor shaft and thus disconnected the current.

"In order to provide against vibration, I was obliged to make the frame of the machine much heavier than I first in-



tended. The 'horseless carriage' was built up in the form of a small truck. The framework in which the motor was placed consisted of a double hollow square of steel tubing, joined at the rear corners by steel castings and by malleable castings in front.

"At that time no figures were accessible for determining the tractive resistance to rubber tires on ordinary roads. In order to determine this as nearly as possible in advance, a bicycle, bearing a rider, was hitched to the rear of a light buckboard by means of a cord and spring scale. An observer seated on the buckboard recorded as rapidly as possible 'draw-bar' pull registered by the scale.

"With this data at hand it was an easy matter to arrange the gearing of the automobile so that it would be drawn by the motor. Crude though this method may appear, it shows a striking agreement with the results obtained today by much more accurate and refined apparatus.

"July 4, 1894, when ready for the test, it was hauled into the country about three miles behind a horse carriage and started on a nearly level turnpike. It moved off at once at a speed of about seven miles per hour and was driven about 1½ miles into the country. It was then turned about and ran all the way into the city without making a single stop.."

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War Industries Board and Representatives of Automobile Manufacturers Make Agreement For Curtailment

Through an agreement between the National Automobile Chamber of Commerce and the War Industries Board, the production of passenger automobiles for the current six months ending Dec. 31, 1918, will be cut immediately, with a maximum output limited to 25 per cent. of the total number of cars produced in 1917.

No announcement was made as to the basis on which manufacturers would operate after that date, but the letter which set forth the plans for the current curtailment repeated the request made some time ago by the War Industries Board that all car manufacturers should get on a war work basis before the end of the year.

Stocks of Materials Unbalanced and Will Be "Matched Up."

The letter was signed by Alexander Legge, vice chairman of the War Industries Board; J. L. Replogle, director of steel supply, and George N. Peek, commissioner of finished products of the board. It declared that, on the basis of reports furnished by automobile manufacturers, the stocks of raw and of semi-finished materials aggregated in value approximately $150,000,000, and were greatly unbalanced and cannot be liquidated until "matched up" with other materials in the manufacture of cars. In part the letter was as follows:

"Supplementing our letter of the 9th instant, we beg to advise that we have now received most of the reports embodying the data and information which we requested you to furnish us and have given those reports careful study and consideration. From them it appears that the stocks of raw materials and of semi-finished materials in the hands of manufacturers of passenger automobiles, while large, are greatly unbalanced, with the result that these large stocks, aggregating approximately $150,000,000, cannot be liquidated until they have been "matched up" with other materials necessary to manufacture the completed cars.

Makers Asked to Limit Purchases of Equipment and Supplies.

"The conclusion has been reached that it is in the public interest, as well as of your industry, that it be assisted as far as practicable, without interfering with the war programme, in the liquidation of its stocks now on hand; and to that end the priorities division of the War Industries board will accord a degree of preference designed to accomplish this result, to all manufacturers of passenger automobiles who will subscribe to a pledge to be prescribed by the priorities commissioner embodying, in substance, the following:

"That the manufactory will limit its purchase, of materials, equipment and supplies to such as are absolutely necessary to match up its stocks now on hand.

Production Not to Exceed 25 Per Cent. of Total Output in 1917.

"That its production of passenger automobiles and all repair parts therefor shall not for the six months ending with Dec. 31, 1918, exceed 25 per cent. of its production for the calendar year 1917.

"That it will conserve and economize in every possible way its stocks of iron and steel, and their products now in its hands, or that may come into its possession, and will release on request of the War Industries Board to such other manufacturer of passenger automobiles as may be designated by the said board such of its stocks as can be utilized by such other manufacturer and which are not required by it for either the limited production above specified or for war work.

"That it will from time to time render such reports of its activities, under oath or otherwise, as may be called for by the War Industries Board.

Again Urge Manufacturers to Get On War Work Basis.

"The War Industries Board will, in carrying into effect the terms of the pledge herein provided for, use as a basis, as far as applicable, the sworn reports recently rendered it in pursuance of its request.

"In justice to the passenger automobile industry we feel again impelled, as the situation appears to us now, to frankly repeat our statement to you of Aug. 9, that the urgent war requirements for iron and steel are so great that the probability of your industry procuring iron and steel after Jan. 1, 1919, for the manufacture of passenger automobiles is so uncertain that we again urge the members of your industry to as rapidly as possible utilize your facilities for the production of direct and indirect war requirements, not only in the interest of the nation, but in the interest of your industry itself. In such effort the members of your industry will have the active and whole-hearted co-operation of this board."

The National Automobile Chamber of Commerce sent out a circular to the passenger car manufacturers explaining the curtailment program and enclosing a pledge. The situation as it affects the industry is summed up by the N. A. C. C. as follows:

To passenger automobile manufacturers:

Your attention is called to the enclosed form of pledge headed

"Passenger Automobile Manufacturers' Pledge,"

which has been prepared by the War Industries Board in pursuance of its letter to the National Automobile Chamber of Commerce dated Aug. 24, 1918.

"For convenience two copies of the pledge are sent herewith, one for your files and the other to be promptly dated, signed and forwarded to C. C. Hanch, Chief, Automotive Products Section, War Industries Board, Washington, D. C.

"Owing to the continued increasing demands of the government for steel, it was decided by the War Industries Board to administer the arrangement made with passenger automobile manufacturers largely from the standpoint of steel.

"No special priority class rating has been assigned to the passenger automobile industry. It is possible that the degree of preference which may be accorded the automobile industry will vary with reference to different classes of steel required. After the pledges have been signed and sent in each manufacturer will make application to the director of steel supply for a permit to purchase steel or steel products. It is our understanding that this applies principally to the items covered by the inventory reports recently furnished to the War Industries Board.

Procedure to Be Followed by Makers Who Assemble Their Product.

"In the case of concerns which are strictly manufacturers, application should be made for steel sheets, carbon forging steel, alloy steel, strip steel, pig iron, bars and cold rolled steel.

"In the case of concerns which are primarily assemblers, application should be made for the principal units, such as motors, transmissions, front axles, rear axles, frames, bodies, steering gears, self-starters and springs.

"In cases where a concern manufactures some of its units and purchases others, application should be made for the classes of steel required for the units manufactured by the applicant and also application should be made for the completed units which are purchased by the applicant.

Regular forms of application will be printed as soon as possible and in the meanwhile the steel section has prepared temporary multigraphed forms, which will be furnished manufacturers upon application to the Directors of Steel Supply, War Industries Board, Washington, D. C.

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The application forms are self-explanatory, but they should be filled out in duplicate and both copies sent to the Director of Steel Supply, War Industries Board, Washington, D. C. The applications will be approved promptly or will be disapproved if the war requirements for any particular class of steel make such action necessary. One copy of the approved application will be returned to the manufacturer, which is to be attached to the manufacturer's purchase order for steel or products made of steel and iron.

Will Furnish Estimates of Each Makers Requirements.

The Automotive Products Section of the War Industries Board will furnish the steel section an estimate of each manufacturer's steel requirements under the program covered by the letter from the War Industries Board to the National Automobile Chamber of Commerce of Aug. 24. These estimates will be based upon the sworn inventory statements filed with the Automotive Products Section by the manufacturers.

National Automobile Chamber of Commerce.

Alfred Reeves general manager.

Passenger Automobile Manufacturers' Pledge.

Following is the form of pledge to be filed by passenger car manufacturers with the War Industries Board, Automotive Products Section:

War Industries Board,

Washington, D. C.

Gentlemen:—

Attention: Automotive Products Section.

The undersigned hereby pledges itself

(1) Not to purchase iron or steel or iron or steel parts or equipment except under permit from the Director of Steel Supply.

(2) To limit its purchase of materials, parts, equipment and supplies to an amount which does not exceed either.

(a) The amount absolutely necessary to match up its stocks now on hand, or

(b) The amount necessary to permit a production of passenger automobiles and all repair parts therefor for the six months ending Dec. 31, 1918, not in excess of 25 per cent. of its production for the calendar year 1917.

(3) That it will conserve and economize in every possible way its stocks of iron and steel and their products now in its hands, or that may come into its possession, and will release on request of the War Industries Board to such other manufacturer of passenger automobiles as may be designated by the said board such of its stocks as can be utilized by such other manufacturer and which are not required by it for either the limited production above specified or for war work.

(4) That it will from time to time render such reports of its activities under oath or otherwise as may be called for by the War Industries Board.

Name of manufacturer_____

Official title_____

Address_____

New Revenue Bill Increases Tax On Owners, Passenger Cars and Taxes Gasoline and Tires

THE manufacturers' tax on passenger cars is more than trebled and the tax on motor trucks nearly doubled in the draft of the new war revenue bill which has been presented to the House of Representatives by Chairman Claude Kitchen of the Ways and Means Committee. In addition there is a provision to tax owners of passenger cars on a horsepower basis and a tax of two cents a gallon is placed on gasoline.

Under the terms of the new measure passenger cars are placed in a so-called luxury list, and are to be taxed 10 per cent. on the selling price instead of the three per cent., which at present is assessed. Motor trucks are to be taxed five per cent. A tax has also been placed on automobile accessories, including tires and tubes, the amount being 10 per cent.

These taxes will produce about $123,750,000, and that the horsepower tax to be paid by passenger car owners will produce an additional $72,920,000. The horsepower tax will be based on the standard method of calculating horsepower by the S. A. E. formula.

Tax on Cars in Owners Hands Will Be Based on Horsepower.

Following are the provisions of the measure which apply to the automobile industry:

"Section 900. That there shall be levied, assessed, collected and paid in lieu of the taxes imposed by section 600 of the revenue act of 1917, upon the following articles sold or leased by the manufacturer, or importer, a tax equivalent to the following percentages of the prices for which so sold or leased:

"(1) Automobile trucks, automobile wagons, automobile trailers or tractors (including tires, inner tubes, parts and accessories therefore sold on or in connection therewith or with the sale thereof), five per centum.

"(2) Other automobiles or motorcycles (including tires, inner tubes, parts and accessories therefore sold or in connection therewith or with the sale thereof), 10 per centum.

"(3) Tires, inner tubes, parts or accessories for any of the articles enumerated in subdivision (1) or (2), sold to any person other than a manufacturer or producer of any of the articles enumerated in subdivision (1) or (2), 10 per centum.

"Section 902. That there shall be levied, assessed, collected and paid upon all gasoline, naphtha and other similar petroleum products having a flash point below 100 degrees Fahrenheit, as tested by the Taglibue open cup tester, and suitable for motor power, sold by the manufacturer, refiner or importer, a tax of two cents a wine gallon.

"Section 1006. That 60 days after the passage of this act and thereafter on July 1 in each year and also at the time of the purchase of a new or used automobile or motorcycles by a user, if any date than July 1, there shall be levied, assessed, collected and paid upon the use of automobiles and motorcycles, a special excise tax at the rates as follows: Motorcycles, $5; automobiles (other than electric) of 23 horsepower or less, $10; more than 23 horsepower and not more than 30 horsepower, $20; more than 30 horsepower and not more than 40 horsepower, $30; and more than 40 horsepower, $50; electric automobiles, $5 per horsepower and 50 cents for each 100 pounds of weight.

"In case of a tax imposed at the time of the purchase of an automobile or motorcycle or any other date than July 1, and the case of the tax taking effect 60 days after the passage of this act the amount to be paid shall be the same number of 12ths of the amount of the tax as the number of calendar months (including the month of sale or the month in which is included the 61st day after the passage of this act as the case may be(remaining prior to the following July 1).

"For the purpose of the section the horsepower of all automobiles other than steam or electric shall be computed as follows: Square the diameter of the cylinder in inches, multiply by the number of cylinders and divide by two and one-half. In the case of steam or electric automobiles the horsepower for the purpose of this section shall be the horsepower rating fixed and advertised by the manufacturer or importer thereof at the time when sold by him."

PURITAN TO HANDLE ALCO PARTS.

The American Locomotive Co., which formerly manufactured the Alco passenger cars and trucks, has sent out a circular stating that the entire spare parts business and stock of parts for these models have been sold to the Puritan Machine Co. of Detroit. The circular letter, which was signed by President Andrew Fletcher, reads as follows:

"When this company discontinued the manufacture and sale of automobiles and trucks an announcement was made that the company would arrange to furnish owners of "Alco" vehicles with spare parts for a period of five years. This period elapsed on Aug. 13, 1918.

"The Puritan Machine Co. has entered into an agreement with this company to supply "Alco" vehicle owners with spare parts for a further five years period ending Aug. 13, 1923.

"We are informed by them that orders for spare parts may be sent for the present to the following: Puritan Machine Co., at Providence, R. I.; International Motor Company, New York City, and Ralph J. Chandler, Los Angeles, Cal."

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PLATE XXVI.

ORNAMENTAL CONCRETE GARAGE FOR ONE CAR

Simple In Construction and Free From Repair Maintenance and Insurance Charges

(Designed by the Architectural Department of the Automobile Journal Publishing Co.)

THERE is no material used in the construction of buildings possessing as many points of superiority as concrete, which is a mixture of cement, sand and broken stone or coarse aggregate, according to the quality of finish desired. It is adapted readily to most any form or type of structure, can be readily handled by the average mason or plasterer, and the ingredients are accessible most everywhere.

A garage built of concrete has the primary feature of permanence, both as to appearance as well as structural stability; is fireproof, and requires no outlay for repairs or maintenance, if properly built.

With these points in mind, the accompanying design for an ideal garage is submitted. It incorporates all the essentials for a building to house one car and is suitable for any estate, at a cost which represents the minimum outlay when the fact is taken into consideration that it is cheaper than a wooden or other type of building, as in the long run maintenance charges are negligible. Its dimensions, 20x12 feet, afford accommodations for the largest car, with ample room to walk about the car and with sufficient room also for a workbench at the rear end.

A foundation wall extending 3 feet, 6 inches below grade, 10 inches thick, will afford ample support for a structure of this size. In erecting the walls, forms should be built on the foundation and the work carried up to the desired height without too long intervals between successive pourings, as there is a tendency to be a marked line between batches of concrete cast at different periods of time. The wall need not be over six inches thick, but unless the very best of materials are at hand and a liberal mixture is to be used, it is better to make the walls nine inches thick.

The walls should be cast of a mixture of one part cement, two parts sand and four parts stone, and should be reinforced with ⅜-inch round steel rods placed 14 inches apart, running both horizontally and vertically. The forms for casting the wall should be made of one-inch matched lumber, supported by 2x4-inch studs to prevent bulging, and they should be built the full height or movable forms of half the height of the walls can be used.

There are a number of ways of treating the surface of the concrete to obtain different effects. By rubbing the concrete with a carborundum brick and applying cement grout immediately after the forms are removed, a smooth finish is obtained. If a rough, pitted finish is desired to match the adjoining buildings, this effect can be secured by use of a sharp pointed tool, and if a pebble effect is preferred, the forms may be removed early and the outer cement film brushed away with a wire brush or washed away with a weak solution of muriatic acid.

With an ornamental type of garage of this character a neat approach adds greatly to the appearance and should have a gentle slope if the ground conditions permit. This can be constructed of a coarse mixture of concrete similar to that used in the foundation walls or floor, and finished off with a layer of fine mixture about an inch thick, scored off to give a paving effect.

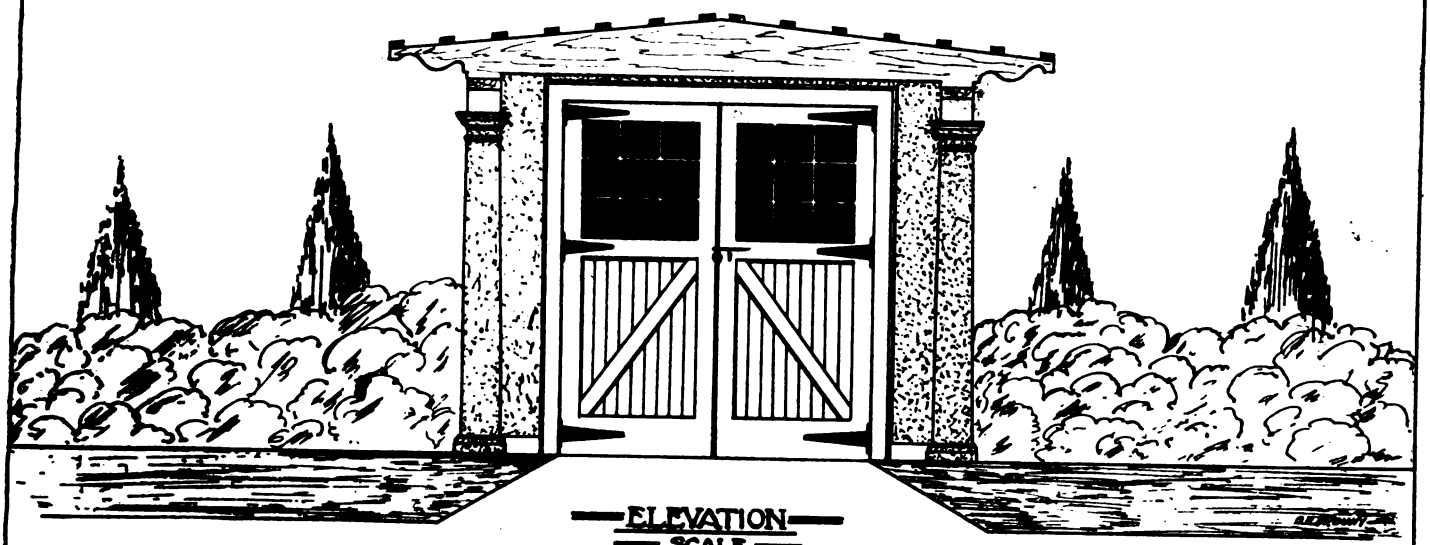
The roof is built up on 4x6-inch plates which are bolted to the concrete walls. Rafters, 2x6 inches, are laid 24 inches on centres and boarded over with hemlock roof boards, ⅞-inch thick, laid three inches apart and covered with extra grade shingles laid four inches to the weather. The cornice is made of white pine stock and painted with two coats of paint. A saddle board of galvanized iron, well painted, is better than wood and gives better service.

The doors are 4x9 feet x 2¼, made of white pine stock and hinged with Stanleys' garage door set No. 1776, which consists of the necessary hinges, catches and fittings. This set, which can be purchased at most any hardware store, includes three pair of 10-inch recessed pad extra heavy T hinges, one 6-inch chain bolt with staples and 6-inch foot bolt with floor plate and a thumb latch with door handle.

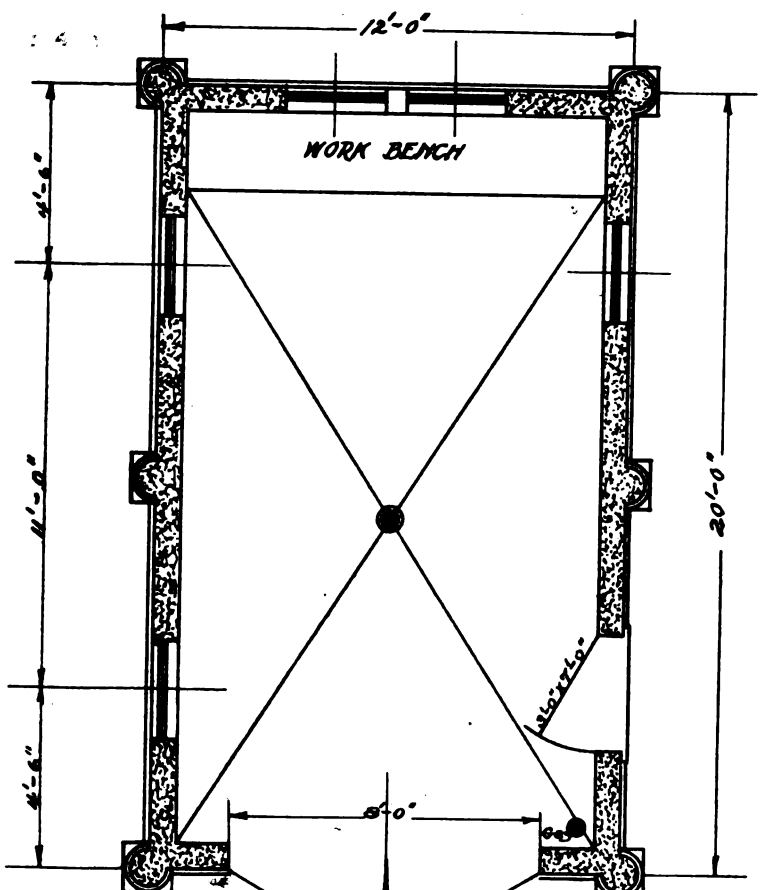
The cost of a building of this type, including the best of materials and fittings, should not exceed $800 under average conditions.

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PLATE XXVI



ELEVATION
SCALE



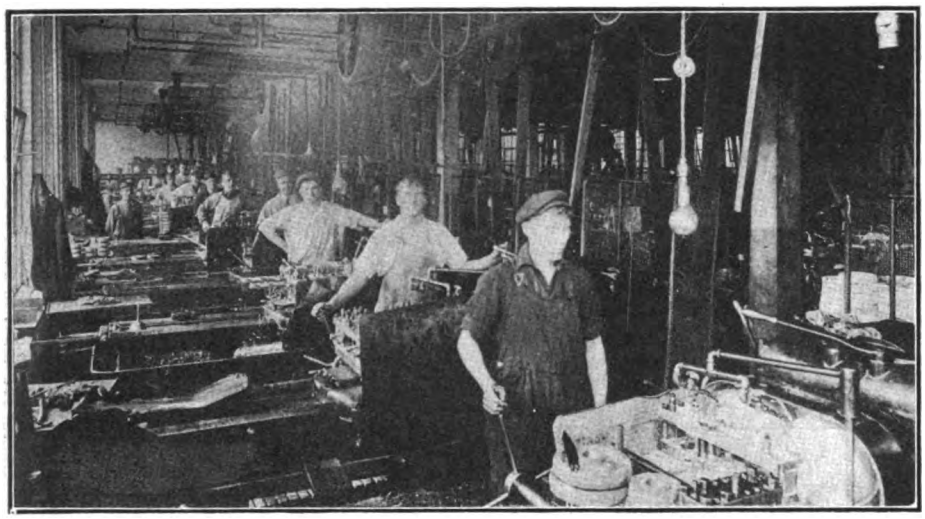
PLAN

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Specializing In Transmission Gears

Covert Gear Company Has Unexcelled Facilities For Production of Gearsets For Trucks and Tractors

By F. E. Mosher, Secretary and General Manager the Covert Gear Co.



Section of the Gear Blanking Department of the Covert Gear Co.'s Lockport, N. Y., Plant.

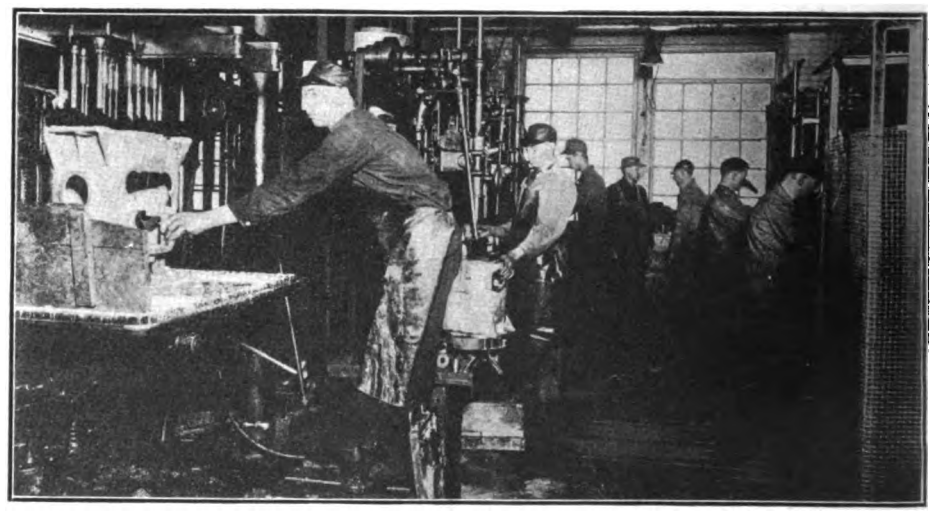
THE motor truck is just being discovered. That is, its stupendous commercial possibilities are just being comprehended, even by the automotive industry. And it is safe to say that the general public has as yet no idea of what the truck will mean to it in the future, nor the magnitude to which the truck business will be developed within a few years.

It has always been thus. Either the coming invention is underestimated, or it is overestimated. The railroad, whose necessarily restricted field should have been at once apparent to every man, was spoken of in glowing terms not long after the first tracks were laid. Each farmer was promised a railroad running through his farm and into his barn yard. The automobile was less fortunate. When it arrived the pendulum of popular opinion had ceased its swing toward the side of credulity, and was well on its journey toward the opposite extreme of doubt. The motor car was the victim and so was the motor truck.

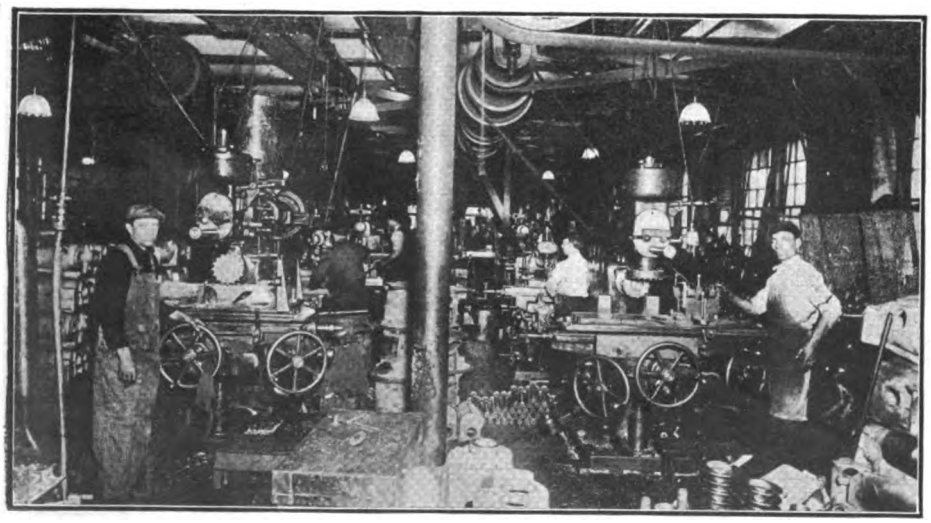
In fact the majority of persons today have absolutely no proper estimation of the possibilities of the motor truck—they don't realize that the truck, not the railroad, will constitute the line which will bring every isolated farm and village into close touch with the world, increase the radius of any one merchant's customer field two, three or four times, and enable the manufacturer to carry on his industrial activities with far greater facility.

Realized Truck Possibilities.

A few firms in close touch with the motor truck field realized the truck's possibilities some years ago. Among these few I believe that the Covert Gear Co. was one of the first. Because our company did realize the possibilities of the truck the Covert company today dominates in the truck transmission field.



Section of the Drill Press Department of the Covert Gear Co.'s Lockport, N. Y., Plant.



Section of the Milling Machine Department of the Covert Gear Co.'s Lockport, N. Y., Plant.

For years the engineering department of the Covert company has made a thorough and first hand study of the requirements of truck transmissions. It has been in intimate touch with the leading truck companies ever since the truck was a commercial possibility. And we must admit that the devotion of the Covert company to heavy vehicle power transmission was because that company foresaw the splendid future of the motor truck when even some motor truck manufacturers did not see it, and through its service in this direction won a prestige among motor car manufacturers that has made the name Covert on a transmission sufficient proof of its worth.

This branch of the industry will at least equal, if it does not outstrip, the

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passenger car, is the faith of Covert officials. That faith was confirmed when in 1916 a number of prominent makers of pleasure cars went into the manufacture of trucks and in 1917 many others joined them. The demand for motor trucks up to the present has largely manifested itself from the cities; today it is beginning to come from the farms and the country—a demand that virtually will never reach a point of saturation.

Can Meet Any Demand.

The Covert company has placed itself in a position where it can handle any amount of business, no matter how great and rapid increase. Its transmission facilities today are absolutely unexcelled. This, of course, is to be expected from almost any firm that has spent years specializing on one part of the motor truck and passenger car. Its engineering department, through long study of truck transmission requirements, is in a position to advise truck manufacturers on this important unit, and if found desirable to design a transmission to meet just this special problem.

The Covert plants in Lockport, N. Y., are splendidly equipped to handle such business. The company has been thoroughly alive to the necessity of a highly efficient organization in every department, but especially in the important engineering and production departments. Men have been carefully selected for all positions of importance and the personnel of the organization ranks with that of any of the foremost organizations in the automotive field. In the automotive industry the names of P. A. Clum, president and treasurer; B. V. Covert, vice president, and A. A. Gloetzner, manager of engineering and sales, are factors to conjure with.

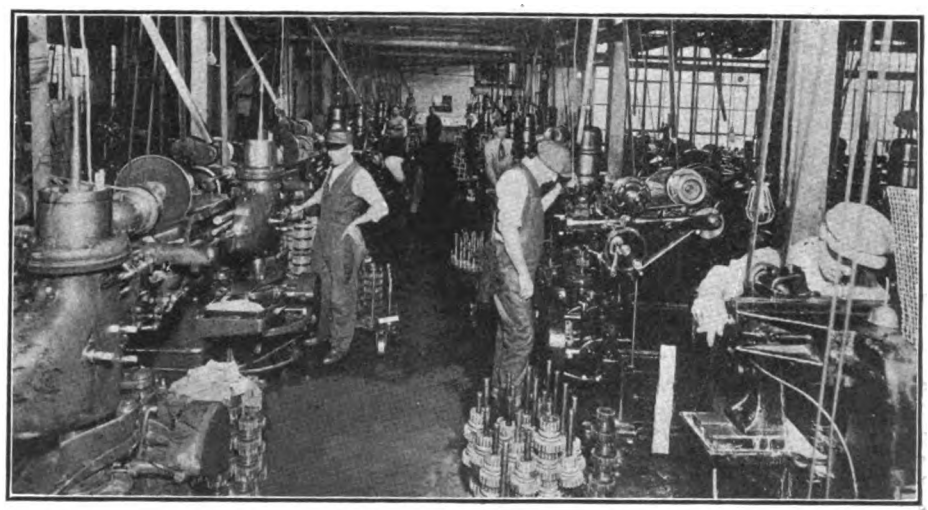


Section of the Gear Inspection Department of the Covert Gear Co.'s Lockport, N. Y. Plant.

Company Founded in 1903.

The Covert Gear Co. was until 1909 the Covert Motor Vehicle Co. It was founded Oct. 27, 1903, to manufacture a small car. Early in 1907 the first transmissions were produced. They proved so successful that within a brief period the company was forced to discontinue motor car manufacture entirely in order to keep pace with the demand for Covert transmissions. In April, 1916, the name of the company was changed to its present title—Covert Gear Co., Inc.

When Philip A. Clum became connected with the company in 1909 the Covert company had reached a turning point in its history. The sales of Covert transmissions in that year were so large that the plant on Richmond avenue, in Lockport, was found entirely inadequate for the increase in production necessary, and a new two-story factory was built on Grand street. At the same time additional property was acquired to provide for future expansion of the business, the company realizing that, at its rate of growth it would double and redouble its output capacity again and again. The vision of the Covert officials proved true.

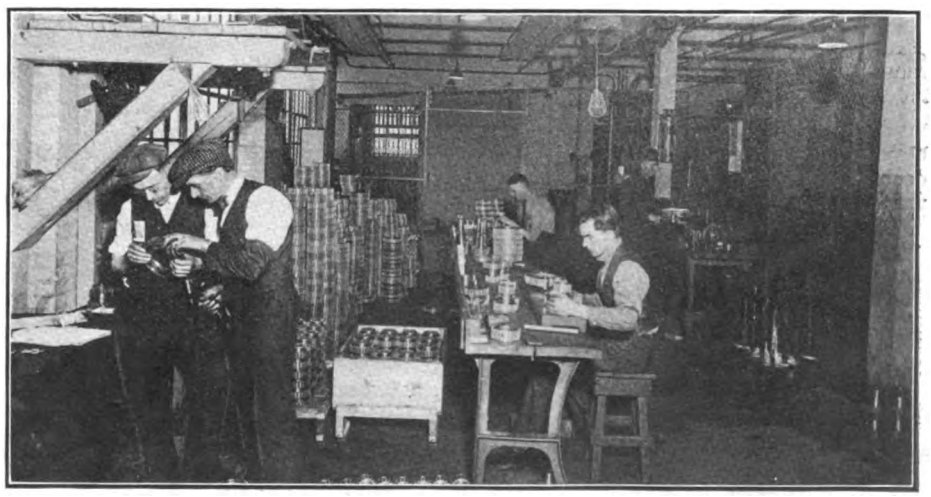


Section of the Gear Cutting Department of the Covert Gear Co.'s Lockport, N. Y., Plant.

In 1910 the company was growing with such rapidity that it was compelled to double its capacity. A further addition was made to the plant in 1913-1916 by the construction of a three-story modern plant to be used for the manufacture of gears, one of the most important items of the product which had hitherto been provided for from outside sources.

The Covert plants in Lockport are in the very center of distribution and the shipping facilities are unexcelled. The proximity of several large manufacturing centers render the raw material supply obtainable without shipping delay.

The plant buildings are thoroughly modern in design and construction, equipped with the latest labor saving machinery, insuring efficient and economical production. The buildings are of brick, steel and concrete construction, thoroughly fireproof and sprinkled throughout.



Section of the Assembling Department of the Covert Gear Co.'s Lockport, N. Y., Plant.

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THE UPKEEP OF THE SPARKPLUG.

Car operators who make it a practice to disassemble the sparkplugs whenever they require cleaning should use the greatest care when putting them together, especially when adjusting the hexagon nut that compresses the washer sealing the space between the porcelain and the shell. If the nut is screwed up too tightly the porcelain will crack as the temperature of the engine rises.

After replacing the plug in the cylinder it is a good plan to test it for leakage. When the engine is running, kerosene may be squirted between the hexagon nut and the porcelain. Leaks will then appear in the form of bubbles.

When testing for leaks, the kerosene can also be applied to the threads of the shell to ascertain that the plug is screwed into the cylinder tightly. A leak around the threads can be stopped by smearing with a mixture of lubricating oil and flake graphite. This method will greatly facilitate future removal.

STOPPING OIL LEAKAGE IN A FORD ENGINE.

(Figure 517.)

Very often the gasket between the crankcase and the oil pan will omit or "spit" oil, and frequent tightening of the nuts will have no effect. This oil pan is made of flexible metal, and a few blows from a hammer where the leakage occurs will so bend the pan as to prevent further leakage.

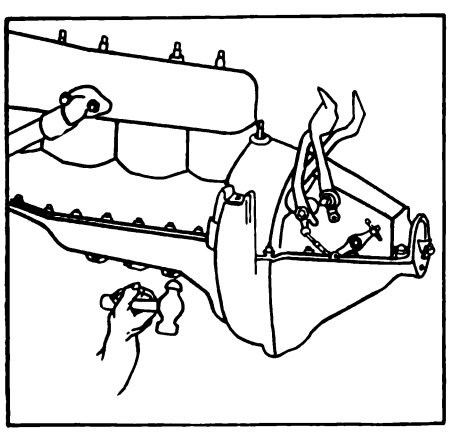


Figure 517.

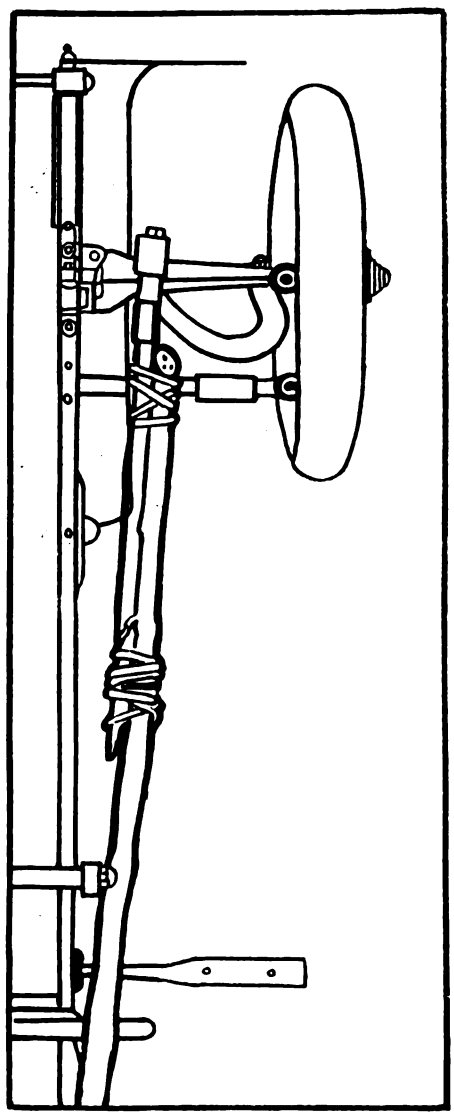


Figure 518.

DRIVING HOME WITH A BROKEN STEERING GEAR.

(Figure 518.)

It is seldom that the steering gear breaks, but when it does happen it is usually in a place where it is almost impossible to make a repair, and it is best to know what to do should this accident occur. First remove the mud guard and then secure a long, slim, round limb from a tree. This is lashed to the steering knuckle as shown in the illustration to form a steering bar, and after this operation is accomplished the car may be driven slowly home in safety.

BRAKE FOR COUNTERSHAFT.

(Figure 519.)

The countershaft clutch keeps up an annoying spinning after the clutch has been disengaged, and some mechanics still use the dangerous method of setting up a braking action with the palm of the hand. A better and safer method is to take a piece of brake lining long enough to reach from the countershaft guide rod over around the clutch pulley and swing a little below. Two copper rivets will hold the end about the guide rod while the other end is fastened in like manner to a piece of wire to which a handle has been attached. When the clutch is disengaged, a pull on this brake will effectively stop the shaft from spinning, the time required to do this depending upon the amount of pressure that is placed upon the brake.

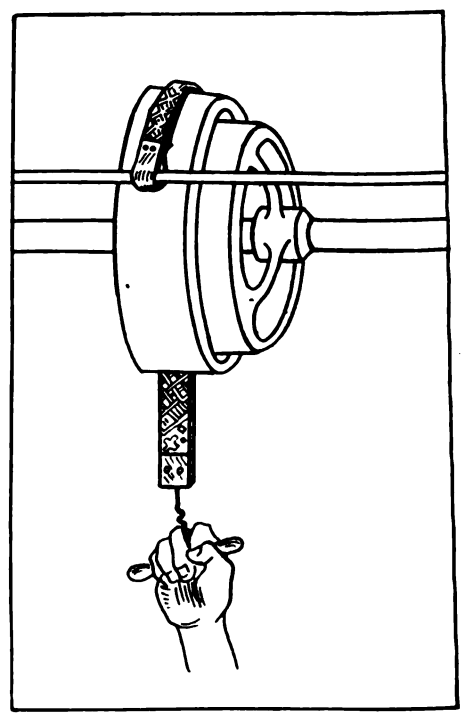


Figure 519.

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TESTING CIRCUIT WITH AWLS AND LIGHT.
(Figure 520.)

Two awls connected on a wire loop to a lamp in the manner shown in the sketch is very useful in detecting a broken wire about an automobile. The idea is to bridge over the defect, or broken wire, and thus locate it. Each of the awls is connected to one end of a wire with a lamp that will indicate whether the circuit is open or broken. The points of the awl can be inserted through the insulation and any part of the wiring or insulation tested in this manner. In testing wires or instruments where there is no current it, of course, is necessary to have some means of producing current, and batteries connected with this device will have the desired effect.

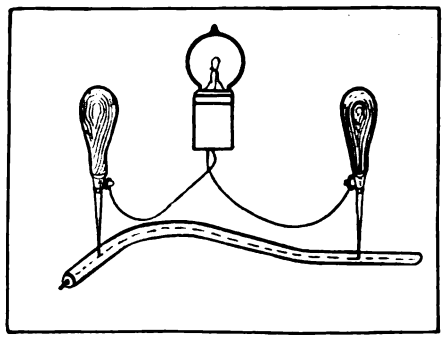


Figure 520.

USE OF MIRROR IN REAR AXLE ADJUSTMENT.
(Figure 521.)

It is of great importance that the drive gears in the rear axle are properly meshed, and if they are not, both trouble and damage are certain to result. In many axles it is very difficult to see the gears after they are assembled in the housing, and in some cases they cannot be seen at all. The gears should so mesh that the teeth come to one-sixteenth of an inch to bottoming.

A small mirror about the size of a silver dollar fastened to a handle something like a dentist's mirror will enable the repairman to see that the teeth of the gears are meshed properly. By inserting this instrument into the axle housing the gears may be plainly seen and adjusted until they are in proper alignment.

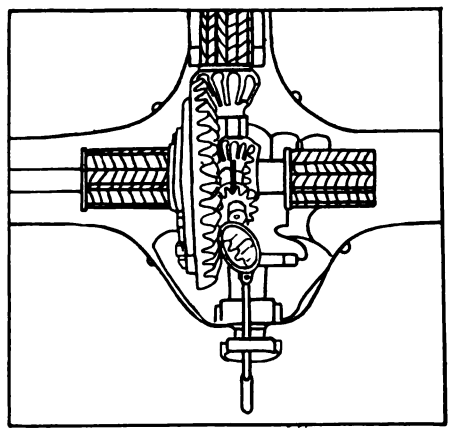


Figure 521.

TAKING OUT PLAY IN SPRING BRACKETS.
(Figure 522.)

When a car has been in service for a long time there generally develops considerable wear in the spring brackets which is responsible for some play. This can easily be fixed by the insertion of suitable sized washers or "shims." If the spring bolts be loose they should be replaced by new ones. Looseness of parts always produces rattles and squeaks that are annoying, as well as hard to find. When "pulling down" the used car, brackets and spring bolts should always be gone over carefully and a careful inspection at this time will eliminate future noise from this source.

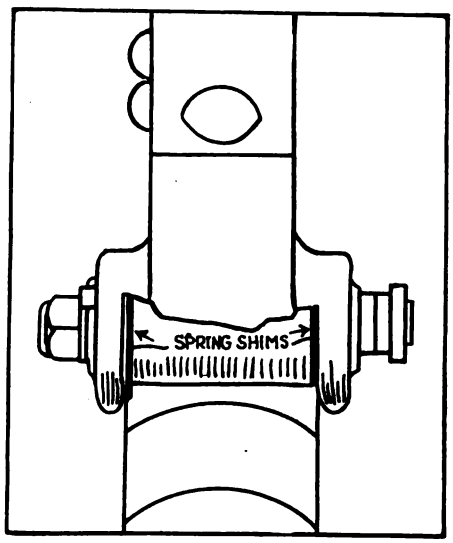


Figure 522.

TESTING FOR WEAK VALVE SPRINGS.
(Figure 523.)

It is frequently difficult to locate the cause of misfiring at low engine speeds. There are several probable causes, but if after making a series of tests for air leakage, weak ignition, poor mixture, etc., the trouble cannot be located, it is advisable to try the exhaust valve springs to determine if they have lost their tension. Should an exhaust valve spring be too weak it will not seat the valve at low engine speeds, which will, of course, result in irregular engine action. A screwdriver blade inserted between the coils of the springs will at once ascertain this defect if such is the case. This operation should be done while the engine is firing slowly. If the missing stops when the blade is inserted between the coils of the spring it will indicate that the spring has lost its tension and that either a new one should be installed or the old one stretched, if possible. The missing results from the tendency of the piston to raise the valve from its seat, thus drawing in some of the exhaust gas.

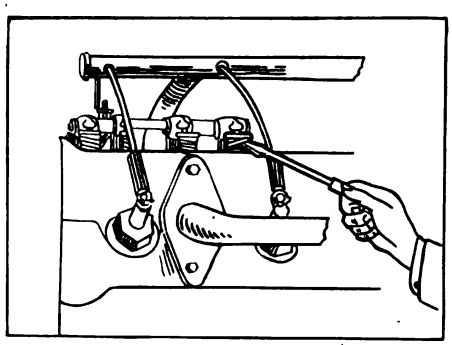


Figure 523.

SOFT WATER FOR RADIATOR.

Radiator manufacturers advise that hard water in the cooling system of the automobile is detrimental because when it is heated the fluid produces a scale which deposits in the form of fine brick colored powder. This substance clogs the fine passages and greatly impairs the radiator's efficiency. A simple test to determine the nature of the water being used is to make a soap solution and fill a glass vial about half full. Then add a few drops of the water that is to be examined. If the fluid is hard, the solution will turn a milky color.

REPAIRING CRACKED WATER JACKET.

While the best possible repair for a cracked water jacket is to have it welded, the following usually meets with success: With a three-cornered file open the crack in the jacket to a V shape without increasing the opening on the inner side. Smooth down the edges and deposit upon them any of the preparations which are sold for silver plating. The material will readily adhere to the smooth surface, and if the pressure is not too great the repair will last indefinitely.

CARE OF THE TOP.

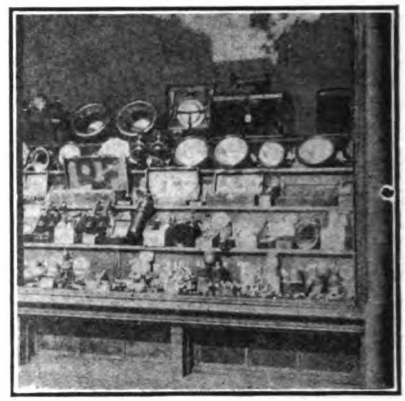
If a top is folded when it is wet it will sooner or later be ruined. Grease or dirt should not be removed with gasoline. This method tends to dissolve the rubber composition in the fabric and will make it blister. The leather top should be washed with soap and water, the water preferably warm. A top dressing should then be applied. The top will hold its shape better if continually left up. When it is lowered care should be taken to push the folds of the fabric well in from the bows, as this will prevent creasing. A brushing inside will do much to lengthen its life. The top curtains and celluloid windows that have been scratched or blurred can be renewed by an application of acetone varnish.

The result of the directions above being carried out will enable the owner to take pride in the appearance of his car and also add an appreciable amount upon the car should he wish to sell.

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Accessories Department



The Carborundum Co., Niagara Falls, N. Y., is marketing their Carbo valve grinding compound in a new combination, flat, oblong can, four inches long, two inches wide and one inch high, as shown in the illustration. This can is arranged to contain fine and coarse compound, two ounces of each, and the tin partition in the centre keeps the two grades separate. It is a very convenient package, both from the shipping and stocking standpoint, as well as for the user, who will always find it right side up.

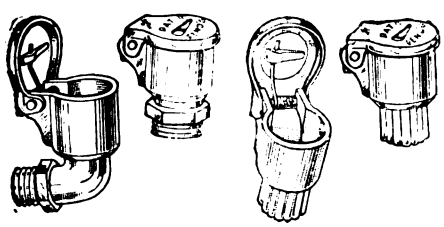
Manufactured and distributed by the Carborundum Co., Niagara Falls, N. Y. Write for prices and literature.

The Puritan Oxgin-Ixa is one of the simplest devices on the market for securing the advantages of mixing moisture with the combustion charge in the engine of an automobile. It is a well known fact that the introduction of a proper amount of water to the cylinders while the engine is running results in the generation of greater power, saves gasoline and eliminates carbon. This device draws the steam from the internal space of the radiator through the radiator hose to the control valve and from there to the Puritan inlet gasket, which fits between the carburetor and manifold, eliminating the need of drilling and tapping to install. The control valve is operated by the driver from the seat and is used for closing the feed when starting a cold motor and when the engine is going to be stopped so that all the moisture will be dried out before the engine cools off and thus eliminate danger of rust. As the steam is taken out of the radiator cap by this device, its operation is not interfered with by rusty water, anti-freeze mixtures, anti-leak compound or anything that would mix with the cooling system.

Manufactured by the Puritan Machine Works, Stoneham, Mass. Write for prices and literature.

Rex All Enclosed Oil Cups have many special features and are designed to meet all needs and incidentally overcome the many objections to the old style cups. They are made with a one-piece shell and easily opened and self-closing cap or lid, which is actuated by a spring, which is enclosed without obstructing the bore. This spring being constantly lubricated it will not rust or stick. The cups are dust as well as rain proof and may be painted without affecting the mechanism or action. They are made in all sizes and are guaranteed as to construction and action.

Manufactured by Frank X. Devlin, 198 St. Claire Ave., Detroit, Mich. Write for literature and prices.

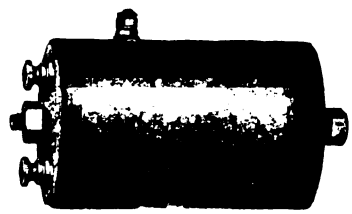


Rex All Enclosed Oil Cups.





The Townsan Valve Adjuster and Silencer.



Jefferson Replacement Coil.

The Jefferson Electric Manufacturing Co., Chicago, Ill., recently placed on the market a line of battery replacement coils and fittings which are sufficiently flexible to displace any type of coil on battery equipped cars. The extreme flexibility of Jefferson coils is obtained from several features, which include the fittings, adjustable caps, terminals and mounting arrangements.

With a small stock of Jefferson coils any service station, garage or repair shop will be prepared for any emergency. Heretofore it has been necessary to lay up a car for several days while a new coil was being obtained. Now, however, any car can be placed in service within a few minutes. It is only necessary to remove the old coil and connect a Jefferson coil. Starting conditions require a coil that will produce a hot spark when the battery is at the lowest ebb. Jefferson coils are guaranteed to take care of this extreme condition.

To aid jobbers, dealers, service stations and garage men the Jefferson Electric Manufacturing Co. have compiled a folder containing complete and authentic data covering all standard battery ignition systems. This folder lists all makes of cars from 1912 to the present date, and gives the year, model, type of ignition and style of Jefferson coils to be used for replacement. This folder will be sent free of charge to any dealer, garage, service station or jobber. Requests for the folder should be addressed to

The Jefferson Electric Manufacturing Co., Congress and Green Sts., Chicago, Ill.

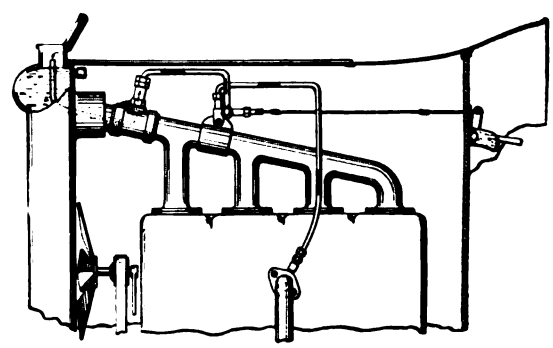
Common Sense Auto Polish is a non-greasy liquid that is strong enough to remove all foreign matter, even cup grease, but is so mild that many of the large piano dealers in the country use it to keep their stock in good condition. It cleans and polishes in one operation, removes all road oil and grime down to the original factory finish and leaves a highly polished dry surface that will not collect dust.

Manufactured by the Common-Sense Manufacturing Co., St. Louis, Mo. 35c size, 75c size and quart, $1.50.

The Townsan Valve Adjuster and Silencer for Fords eliminates the click of the valves and takes up the wear. It is adjustable from time to time and can be placed on every valve, regardless of play, for it takes up play from the thickness of one disc, .006 inch and upward, to the amount necessary to quiet the valve.

Manufactured by the Midway Mechanical Co., St. Paul, Minn. Long sleeve of all models previous to 1912, and short sleeve for 1912 model and later. Write for prices and literature.





The Puritan Oxgin-Ixa.

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The Advance Automobile Accessories Corporation is introducing a transmission lining for Ford cars that can instantly be identified by a white stripe running along the center. In a folder headed "Another Triumph of America's Genius," this lining is described as setting a new standard in transmission fabric quality. A treatment has been worked out by the chemists of the Advance institution which resists and neutralizes the action of hot oil on cotton fabric. Moreover, a mechanical method of applying the treatment to the woven fabric also has been successfully developed, with the result that White Stripe solution thoroughly saturates every fiber of the lining, making it retain its heat and oil resisting qualities longer than any lining now on the market.

White Stripe Lining is to be marketed both in rolls and strips of three to the box. The retail price per box of three, east of the Rockies is $2, and from the roll the retail price is 32 cents per foot.

Manufactured by the Advance Automobile Accessories Corporation, 56 E. Randolph St., Chicago. Write for prices and literature.



The Guide Motor Lamp.

The Guide Motor Lamp is a special new type heavy duty electric truck head lamp. This lamp is of the same size as has been used on class "B" U. S. trucks, but of much simpler construction, much cheaper and is equipped with a special front lens. The most important features about the lens is that it is designed to project a clear, wide ray of light directly on the ground, eliminating the glare above the three foot limit, and with the 180 degrees spread to the sides it gives the desired light on the sides for turning, getting into difficult dark alleys and driveaways, etc. It is absolutely dust, water and rattle proof. While the brackets are of the standard fork type of six-inch centers, it is subject to a small range of latitude. If necessary it can also be provided with the class "B" type of brackets. The compliments the Guide company have received from the few truck engineers who have had a chance to see it would indicate that this type will meet with great success.

Manufactured by the Guide Motor Lamp Manufacturing Co., Cleveland, O. Write for prices and literature.

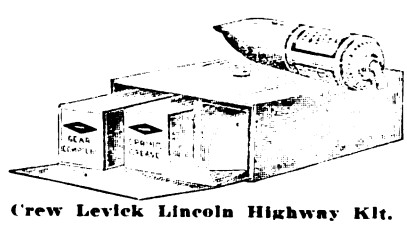
The Niswander Rim Remover is a practical and handy tool for removing and replacing the demountable rim in automobile tires. The contracting and expanding is done by right and left hand threaded rods operated by a hand wheel, which gives an even and steady pull, contracting the rim anywhere from one to four inches, and the rim hooks, together with the rim braces, are so constructed that the harder the pull the tighter they grip the rim in either operation. The rim hooks are made of a good grade of spring steel and will, therefore, adjust themselves to any width rim. The tool weighs two and a half pounds and folds to a length of nine inches, making it possible to store it in the tool box.

Manufactured by the Niswander Manufacturing Co., Quincy, Ill. Price, $3.50.

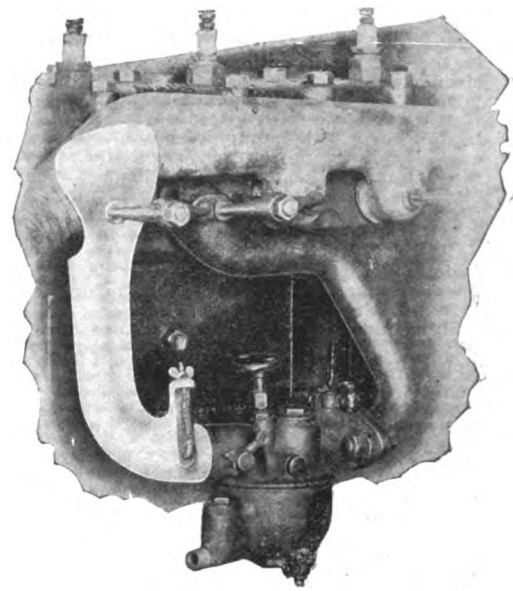
Motor Driven Visible Measure Gasoline Dispenser.



The Niswander Rim Remover.



Crew Levick Lincoln Highway Kit.



The "Ritemix" Gasoline Economizer and Compensator is a carburetor air heater and regulator for the Ford engine, consisting of a scientifically constructed air valve fitted into the opening of a specially designed pipe which replaces the regular hot air pipe leading to the Ford carburetor. This device has an exceptionally large flange, which fits over the top of the exhaust manifold, preheating the air about 200 per cent. in excess of the amount heated in the original hot air pipe. The valve moves with each pulsation of the engine and supplies a uniform amount of air at all engine speeds, thus insuring a proper mixture of gasoline and air at all times. It can be installed in two minutes time by anyone without boring or fitting and requires no attention when once installed.

Manufactured by the Perfection Auto Parts Co., 2130 Superior Ave., N. E., Cleveland, O. Price, $3.50.

The Motor Driven Visible Measure Gasoline Dispenser is designed to eliminate the incidental losses in the vending of gasoline. The accompanying illustration shows the general appearance of the apparatus opened up to show the mechanism. The pump is driven by a Westinghouse one-quarter horsepower motor, entirely enclosed in the base in accordance with the rules of the National Board of Underwriters. The Brady dispenser visibly delivers a full gallon for every gallon ordered. When the wagon delivers gasoline to the garage the tank gauge shows accurately the full quantity obtained. Every gallon drawn from the tank into the dispenser is shown on the tank register, which can be checked with the tank gauge. Thus both the public and the garage owner are protected from loss. Furthermore, the oil companies are enabled to make more rapid deliveries than by measuring cans from wagons to garage tank where the Brady dispenser is installed.

Manufactured by the Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa. Write for literature and prices.

Grease-in-Tubes is the clean, handy, ready way to use grease. It is economical, as there is no waste—fresh grease always being ready and usable to the last drop. This grease is put up in three tubes in a carton called "The Lincoln Highway Kit" and consists of one tube of cup grease, one tube of spring grease and one tube of gear compound. This grease is of the best grades obtainable and is always ready for instant use without the usual soiling of hands and clothing in inserting it.

Manufactured by the Crew Levick Co., 111 N. Broad St., Philadelphia, Pa. Price, $1 a kit.

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The Gusher Water Circulation for Fords is the simplest and most efficient water circulatng pump. It is made of best materials, is accurately machined and is furnished complete with belt ready to install in the car. This pump keeps the water cool, increases power and saves the engine from overheating. The Gusher will circulate five gallons of water every minute, thereby increasing the present circulation from seven to ten times as rapid as gravity—that being the present circulation of the Ford. The Gusher is sold on a written guarantee of money refunded if not entirely satisfactory.

Manufactured by the Cluley Auto Supplies Co., 471 E. Ohio St., Chicago, Ill. Price, $5 complete.

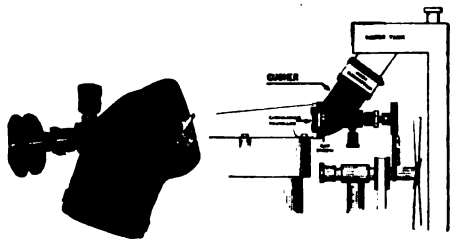
The Red Devil Circular Glass Cutter, No. 033. When in operation, the glass to be cut is placed on a flat surface, the base of the cutter at the centre of the glass to be cut. Careful measurement should be made and the cutter head adjusted to one-half the diameter of the circle to be cut, and fastened in place by the thumb screw. The base to be pressed down and held firmly in place by one hand and the head operated by the other, the point of beginning to be away from the body so as to give the hand of the arm operating the head an opportunity for a wide sweep. Some practice may be necessary, but the cut can be made by a firm pressure, not too heavy, and as nearly as possible by one sweep around the circle without stopping. In cutting, the base must not be allowed to slip or change position, and if necessary, two sweeps or two cuts may be made, as nearly as possible a full one-half circle in each.

The small illustration shows how to break the glass to leave the circular glass for use. Cuts are made from the outer circumference of the circle to the edge of the glass. The pieces can be broken off by gently tapping on the under side of the cuts, but away from the edges of the circle, to prevent breakage of the inner portion

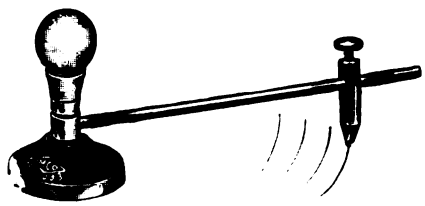
Manufactured by the Red Devil Tool Works, Smith & Hemenway Co., Inc., 120R Colt St., Irvington, N. J. Price, 50 cents.

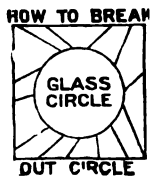
A New Guide Book Case has been placed upon the market for motorists who have experienced the difficulty of reading a road guide book under adverse wind and weather conditions. This annoyance can be eliminated and the comfort of the trip increased by the use of this attractive and convenient case. The front is made of transparent pyralin sheeting and the back of a pyroxylin coated leather substitute of the Fabrikoid type. The guide book, opened at the desired page, is slipped in under the pyralin sheet and the text is easily read even when the car is traveling at a high rate of speed. The wind cannot rustle the leaves and the Fabrikoid cover protects the binding and leaves from rain and grease, as it is absolutely proof against all three.

Manufactured by the Du Pont Fabrikold Co., Wilmington, Del. Write for prices and literature.

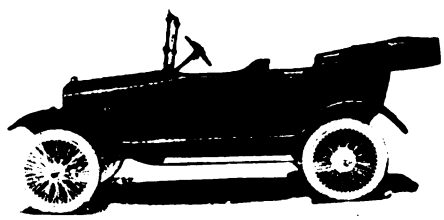


Gusher Water Circulator.

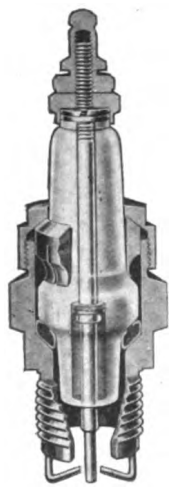




The Red Devil Circular Glass Cutter.



"Amesbilt" Five-Passenger Ford Body.



Hercules Spark Plug.

"Amesbilt" Five-Passenger Ford Bodies have every detail and quality known to the master builder. The makers claim that the same workmanship, quality and class of material that go into the high-priced motor car built "Amesbilt" bodies are used in these Ford bodies. The seats are tilted to invite relaxation. The cushions are fitted with deep coil springs of the proper resistance to absorb road shocks and the body sets low and has pure stream lines. The inside measurement from dash to back of front seat is 42 inches. Depth of cushions 17 inches. Front seat 36 inches wide. Back of front seat to back of rear seat 39 inches. Depth of rear cushion 20 inches. Overall length 122½ inches. These bodies are made in a variety of styles at attractive prices.

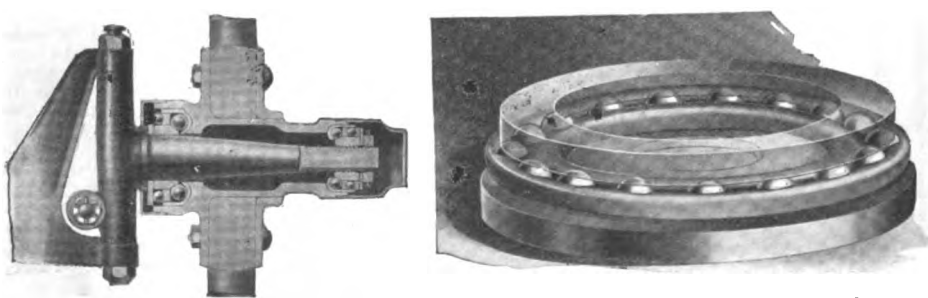
Manufactured by the F. A. Ames Co., Inc., Owensboro, Ky. Write for prices and literature.

Roll-Rite Ball Bearings improve the present Ford bearings, two of which fit perfectly into each front wheel in conjunction with the original bearings, thereby giving four bearings to each wheel, and are in contact with the present bearings (only a little metal retainer and felt washer being removed, the metal hub cap supplied with these bearings fits over the inside of the hub), causing a perfect alignment and true operation of these latter bearings, the race washers of these bearings serving also as race washers for the Ford bearing. The balls are held in place by a rivetless metal retainer, preventing crowding together and allowing each ball to operate independently of the others. This bearing will also fit the Chevrolet 490 car. It is easily installed by removing the wheel and slipping bearing into place.

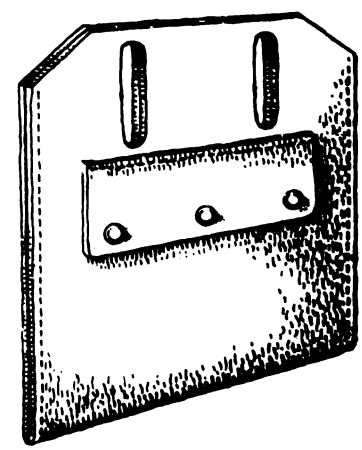
Manufactured by the Roll-Rite Mfg. Co., Charleston, S. C. Write for prices and literature.

Hercules New Model Spark Plugs have a spring gland that is the result of years of experimental work with a view to eliminating recognized weaknesses of the old style construction. This gland slips over the porcelain beneath an outer lock nut, its lower flange riding top of the tapered shoulder and absorbing contraction and expansion through its sliding spring action. It serves further to prevent loosening through expansion. The copper packing seat is still used, but it is relieved of excessive strain through the spring action of the upper gland. The double packing system serves to hold the plug compression tightly by absorbing the shock or strain and maintains a perfect alignment and stability. Loose assembled centre stem, reinforced electrode and other special features are exclusive with this plug.

Manufactured by the Eclipse Mfg. Co., Indianapolis, Ind. Write for prices and catalogue.



Roll-Rite Ball Bearings Showing Their Application to the Ford Axle.



Fabrikoid Guide Book Case.

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Corbin-Brown Speedometers are made for automobiles, motor trucks and motorcycles, and in special models for Ford cars, operate on the centrifugal principle, and thus are not affected by extreme temperatures or by electrical influence. Quick jumps or slumps of the thermometer do not disturb the Corbin-Brown reliability, nor is the instrument affected by the electrical influence exerted through an electric lighting system or an electric self-starter on a car.

The drive gears and shaft are in one piece for greater strength and accuracy. The cable is of the exclusive link type, which gives maximum strength and practically eliminates friction in the casing. It is almost unbreakable, but if a repair should be found necessary a new link can be easily inserted by anyone. While this cable is strongly recommended by the Corbin company, the flexible shaft type can be supplied instead if desired.

One of the most valuable exclusive features of the speedometers is the maximum speed hand. This hand, fitted as an extra, registers the highest speed attained by the car and remains at that point until reset to zero. This can be done in an instant at any time.

The maximum speed hand does away with the annoyance and risk of watching the speedometer to keep track of speed while traveling at a fast pace. The record of highest speed remains as long as wanted.

For use on motor trucks, the maximum speed hand can be supplied with locking arrangement to prevent resetting by the truck operator. It thus acts as a reliable check on overfast driving, as the speed record remains for inspection by the employer. It cuts repair bills, eliminates accidents and adds to the life of the truck.

The special models for Ford cars can be supplied complete with handsome cowl board, or simply with a neat bracket for attaching to the dash.

The Corbin company has an interesting illustrated catalogue, dealing in full with the attractive features of its speedometer line, which will be sent upon request.

Manufactured by the Corbin Screw Corp., New Britain, Conn. Write for prices and literature.

The Warren Vaporising Device is a mixing or vaporizing gasket. Every automobile or gas engine has, at the point where the carburetor is attached to the manifold intake, a gasket, usually of asbestos, placed there simply for the purpose of making this an air-tight joint where the two metal flanged ends of the carburetor and manifold come together and are attached by bolts. The central orifice of this gasket is open, the same size as the inside of the manifold intake.

At this point, and to be used in place of the ordinary gasket, is where this mixer or vaporizing gasket is used. It requires absolutely no changes at all in the engine, no holes to bore, no special tools, no adjustment, no movable parts, but is simply inserted at this point in place of the open gasket in common use and above referred to. The vaporizer is formed by using two thin gaskets of regulation size and shape, of asbestos; one especially cut copper gasket of the same size and shape, with extending fingers, and two sets of woven screen wire of the full size and shape of the gasket, and covering the central orifice or opening. This is assembled with an asbestos gasket between each sheet of wire gauze, with the metal plate used for one outside, with extending fingers which go over and engage the other outside gasket, and when cemented and compressed together, make a compact, air-tight gasket exactly the size and shape of the one ordinarily used at this point, with the exception that the central opening is covered with two thicknesses of gauze screen wire of proper mesh.

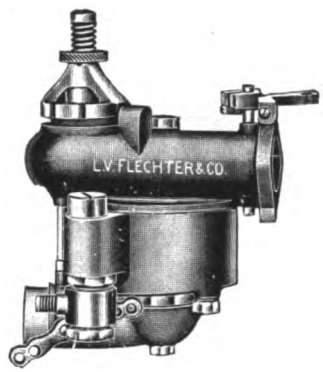
When inserted, all gas and air passing from the carburetor to the combustion chamber of the engine must pass through this mixing or vaporizing gasket. Small drops or particles of gasoline cannot pass through, but are broken up into the form of gas, making a more uniform mixture, and getting power out of every drop of gasoline that passes through, by transforming it into explosive gas.

The object of the carburetor and mixing chamber is to vaporize gasoline. Through the needle valve or spray nozzle of the ordinary carburetor a big percentage of gasoline reaches the combustion chamber of the engine still in liquid form—sprays or small particles of drops. The only portion of it from which the power is obtained for the explosion is that part that is transformed into gas. The portion still held in liquid form merely burns, passes out through the exhaust valve in flame, leaving a deposit of carbon in the cylinders.





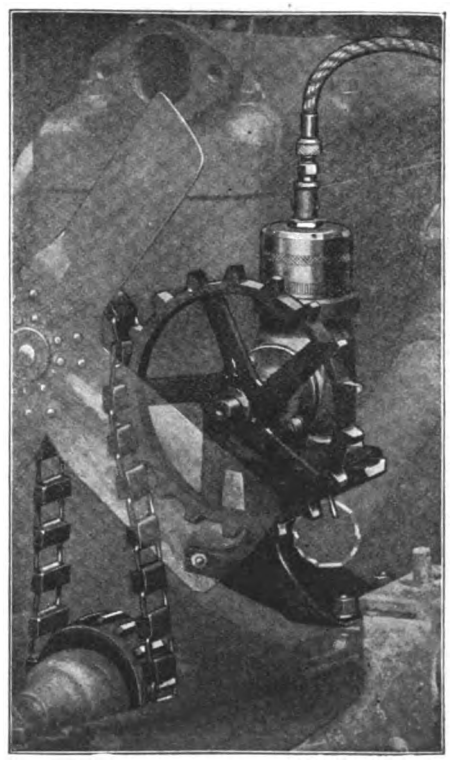
Distributed by John W. Warren, San Antonio, Tex. Write for prices and literature.



The Flechter Carburetor.

The Flechter Carburetor's correct principles of vaporization and air mixing have been combined with simplicity of construction to a degree that insures unusual fuel economy with reliability of operation. Complicated adjustments that can only be properly set by experts have been eliminated entirely. In this carburetor a "fixed" nozzle or spray is employed. The orifice of this jet is calculated for the size of the carburetor and the type of engine on which it is employed, and it is unalterable, the only adjustments necessary being those regulating the air supply. The low speed air adjustment acts directly on the amount of air admitted and is of the simplest form. It is placed on top of the carburetor and will lock at any point for which it is set. No tools are necessary to make adjustments, and both the low and high speeds are plainly marked so that they can be turned to the proper direction to give the result desired.

Manufactured by L. V. Fletcher & Co., 192-200 Jackson Ave., Long Island City, N. Y. Write for prices and literature.

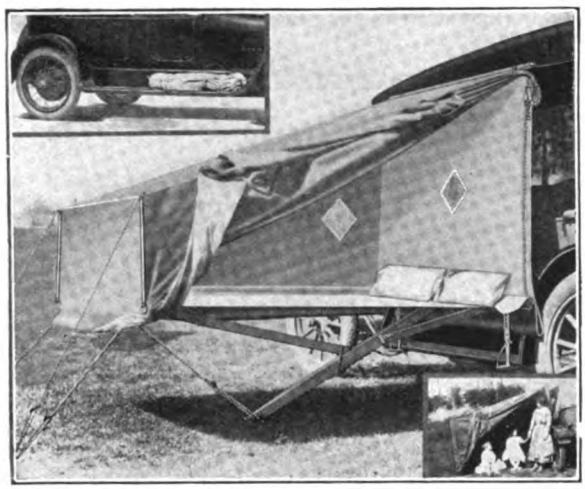


The Crane Power Tire Pump Operated with the Crowe Mechanical Fan Belt.

The Crane Power Tire Pump and the Crowe Mechanical Fan Belt make a successful application of a power tire pump to the Ford car. The power is taken from the shaft of the engine. The Crowe Fan Belt consists of a steel chain into which blocks of oak tanned sole leather are firmly embedded. When used with the Crane Pump the belt serves a double purpose. In turning the fan it acts as a friction belt, as the fan pulleys come in contact with the leather only. The belt is engaged with the pump sprocket only when the pump is in operation, acting then as a silent chain and insuring a positive drive. Instead of being set into the moving piston, the Crane packing ring is stationary and the piston moves through it. By slightly turning the cylinder, which is threaded into the crankcase, the ring is compressed (being of patented design and special alloy) so that it hugs the piston more closely; thus the adjustment is variable to compensate for any wear and the compression is increased at will. This adjustment can be made while the pump is in operation. The pump, bracket, 13 feet of pressure hose with gauge, bolts, nuts and driving parts, together with the fan belt, are sold complete ready for installation.

Manufactured by the Bay State Pump Co., 100 Purchase St., Boston, Mass. Price, $12. Write for literature.

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Whittmann Motor Camps.

The Hoggson Auto-Time Register is designed to fill the requirements of the small shop employing only a few men. This machine not only records the "In" and "Out" of employees, but also "Sales Made," "Goods Received" or "Delivered;" from the place is recorded and initialed in fact, everything coming to or going by the person in charge. The record is made on a paper strip from the roll attached to the back of the machine and it feeds through a guide. By the aid of suitable slips or cards it will time job work, cost of manufacture, etc., without any interference with the paper roll. It is self-inking and prints clear and distinct the year, month, day, hour, minute.

Manufactured by S. H. Hoggson & Co., 27 Thames St., New York city, N. Y. Price, $25 complete.

"Triplexd" Gasoline Hose uses the highest quality hose cord in its fabric cover, which is woven on with a circular loom, laying the fabric on the rubber under a pressure of 330 pounds to the square inch, so that it bites right into the rubber, which is pressed still closer around the metal lining. This metal lining, the makers claim, is the most flexible construction ever devised. The steel strip is made of best quality slow-rolled metal of accurate, uniform thickness and heavily electro galvanized, forming a gasoline hose that is non-leakable and of great durability and strength.

Manufactured by the Metal Hose and Tubing Co., Brooklyn, N. Y. Write for prices and literature.

Whittmann Motor Camps, when packed are only four feet six inches long and six inches in diameter. They strap to the running board of the car and the duffle which incloses it permits room also for the stowing of blankets, etc. It is but the work of a moment to unroll it, fasten one end to the running board, set up its one leg peg down the guy ropes and fasten the peak of the tent over the car. The tent is then ready for the night and the double bed, which is 4½ feet wide by six feet three inches long, is as comfortable as a mattress. The camp walls are joined and overlapping with a screened port on each side, adjustable from within to admit the breeze, but so designed as to exclude rain and insects. These camps are made for two, four, six or eight people with separate rooms for each two. The dimensions of each room are six feet eight inches long by four feet six inches wide. The bed tension is automatically self-adjusting to weight and sags less the more weight is put upon it. The tent is made of waterproof balloon silk and the entire equipment, including tent, bed and carrying case, weighs 15 pounds per person.

Manufactured by J. H. Whittmann Manufacturing Co., Kansas City, Mo. Write for prices and literature.



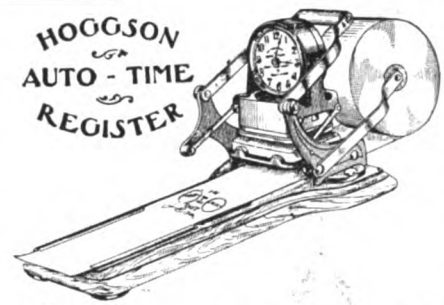
"Triplexd" Gasoline Hose.

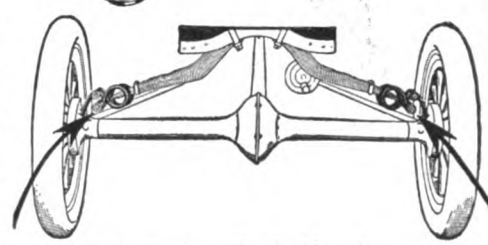


Ekern Portable Garage Grease Gun.



Nugent's Shaft Oiler.





Twin Spring Shock Absorbers.



Garco Gaskette Roll.

Garco Gaskette Roll was devised for the countless small repair jobs where a cut piece of sheet packing is needed. It is made of specially selected long fiber asbestos with a network of strong fine wire interwoven in it, giving it the greatest possible strength and wear resisting ability. It is packed in a durable, dust proof carton cut 10 inches wide by 40 inches long. It is also furnished in full rolls of 250 pounds and half rolls of 125 pounds.

Manufactured by the General Asbestos and Rubber Co., Charlestown, S. C. Write for prices and literature.

The Ekern Portable Garage Grease Gun consists of a heavy seamless steel cylinder mounted on three wheels, having five feet of hose attached to the bottom of the cylinder, with shut off valve and nozzle at the end of hose. It registers and measures accurately the amount of grease put in the gear case or differential, and will work equaly well on liquid oil as well as hard grease. It is equipped with two sets of gears. When the crank is pushed in it disengages the low gear and immediately engages the high gear, which operates the piston either up or down at high speed. The cylinder is 20 inches long by six inches in diameter, capacity 20 pounds of grease or 2½ gallons of oil. The piston is covered with best quality cup shaped leather and is provided with an expansion ring in piston, which prevents any grease or oil from leaking by. The piston also has an automatic air vent, which releases the vacuum in the cylinder when cranking the piston up for refilling. The base is provided with a step lock which lifts the castor up off the floor and sets the gun rigidly while cranking.

Manufactured by H. G. Paro, 1410-12-14 S. Michigan Boulevard, Chicago, Ill. Price, $47.50.

Twin Spring Shock Absorbers for Fords eliminate jolts, jars, strains and vibration. The Twin Spring is a supplementary spring, instantaneous in its action, leaving the leaf spring free to perform the work for which it was designed. Every road shock coming from the wheels passes through the coil springs on its way to the car body, and the shock is transformed and the life taken from it without in any way disturbing the action of the leaf springs. They are easily and quickly applied in 30 minutes to any type or car spring, and, once adjusted, never change their position.

Manufactured by the Twin Spring Co., 1000 Boylston St., Boston, Mass. Price, $10 per set (rear) for Fords and all cars.

Nugent's Shaft Oiler prevents accidents as it does the job from the floor, saves oil and time and reduces danger to a minimum. The can holds two quarts of oil and is made of very heavy material. The pump, barrel, plunger and ball check valves may be examined, repaired, replaced or recleaned at any time, as all parts are easily accessible. The opening for the long spout is tapped one-quarter of an inch (pipe tap), so by using an elbow or a 45 degree L at this point the spout may be set at right angles or 45 degrees. The curved nozzle at the top end may be changed to suit conditions.

Manufactured by Wm. W. Nugent & Co., Chicago, Ill. Write for prices and literature.

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The Puritan Inlet Gasket is designed to facilitate the connection of auxiliary air valves, moist air devices, primers, decarbonizers. They replace the ordinary gaskets between the carburetor and manifold and are made of solid brass, machined to a perfect surface. The inlet hole is bridged, insuring strength, and is so placed that the auxiliary charge is mixed thoroughly with that of the carburetor. The use of this gasket does away with drilling and tapping and is very easy to attach, it being unnecessary to disconnect gasoline feed pipe or hot air tube. By fitting a pet cock to the inlet gasket it can be made into a very efficient decarbonizer by attaching a rubber tube with the other end in a pail of water. When the engine is warm and running slowly about two quarts of water is fed into the engine every 500 miles. The gaskets are tapped ready to receive a standard one-eighth inch pipe or tubing connection. In ordering it is only necessary to state size of carburetor or to give make and model of car.

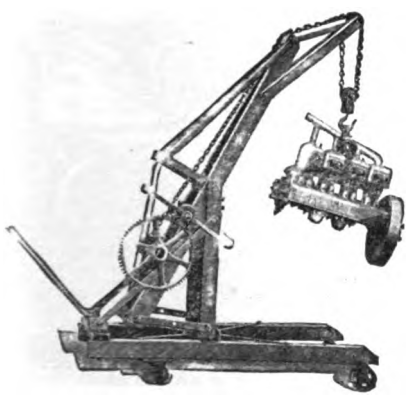
Manufactured by the Puritan Machine Works, Stoneham, Mass. Write for prices and literature.

The Universal 22-Ton Auto Press has a high power leverage, starting at 2200-1 pounds and automatically increasing at the end of stroke to 5000-1 pounds. This is obtained by the lever fitting into the socket on ratchet block. The pawl uses the same notches in hand wheel and tremendous pressure is obtained on the screw with little effort. An important feature of this press is that the screw being exposed at the top may be struck a sharp blow in obstinate cases, such as a rusted shaft, which pressure alone will not move. With maximum pressure the jar of the blow does the rest. No damage to the press will result, as it is designed to withstand such a blow. The low power leverage of (1000-1) is 10 times quicker than a ratchet. This press is self contained and can be moved about to suit conditions or turned over for pressing long work.

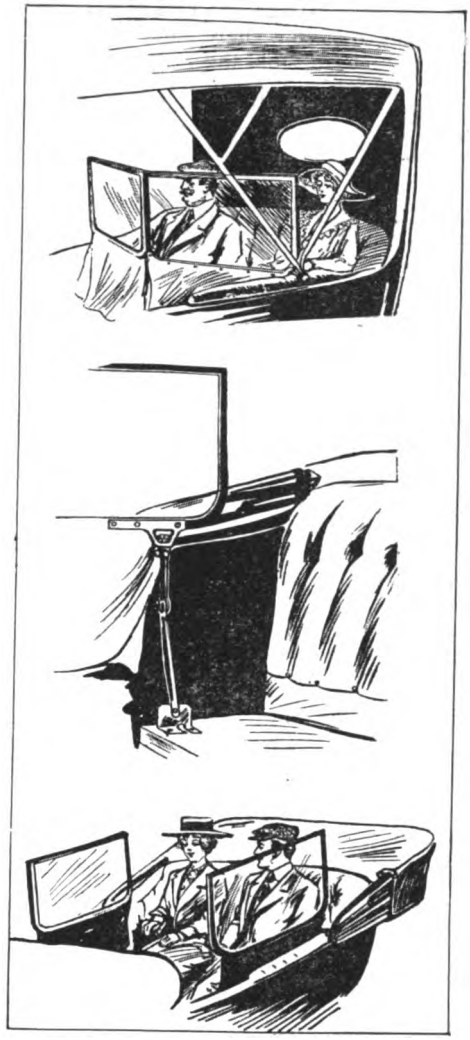
Manufactured by the United Engine and Manufacturing Co., Hanover, Pa. Price complete, $55. Write for literature.

The Manley General Utility Garage Crane combines a half dozen different tools into one and may be used for a hundred different purposes in the garage and outside on the road. It can be mounted on a truck, chassis or service wagon for use as a general wrecking crane, or if no truck is available it may be taken apart and placed in a touring car and at the scene of the wreck may be set up in five minutes by two men. It takes up little room when in use. As a portable floor crane it will lift the front and rear ends of automobiles or transport any piece such as the engine, transmission, etc., on its own wheels anywhere. Its capacity as a floor crane is 1½ tons; as a wrecking crane, two tons.

Manufactured by the United Engine and Manufacturing Co., Hanover, Pa. Write for prices and literature.



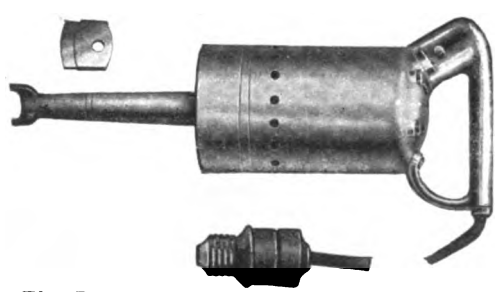
Manley General Utility Garage Crane.



The Clark Tonneau Windshield.



Universal 22 Ton Auto Press.



The B. F. S. Electric Valve Grinder.

The Clark Tonneau Windshield eliminates the strong wind pressure and the clouds of dust which often envelop those on the rear seat. The windshield is easily attached without disturbing the upholstery on the car. When it is not in use it is turned back out of the way, but can be brought into service by a slight pull.

Manufactured by A. N. Clark & Son, Plainville, Conn. Write for prices and literature.

The B. F. S. Electric Valve Grinder is a compact portable motor driven device designed for grinding the valves of all internal combustion engines in a shorter length of time than is required by ordinary hand methods. The familiar oscillating motion employed in hand grinding is used by the grinder, which gives 800 to 900 oscillations per minute, a speed not obtainable in hand work. The gears are packed in grease, thus insuring perfect lubrication and noiseless operation. The switch placed conveniently in the handle is actuated by a slight pressure of the finger, starting or stopping the motor instantly. This machine weighs less than five pounds, which the makers claim is the right weight for ordinary valve grinding, and a light pressure is only necessary in cases where valves are badly pitted. Each grinder is fitted with an eight-foot cord and plug to fit the usual lamp socket and standard machines are made for 110 to 130 volt alternating or direct current. These are furnished in higher voltage if specified. Bits for standard slotted or pin hole valves complete the outfit.

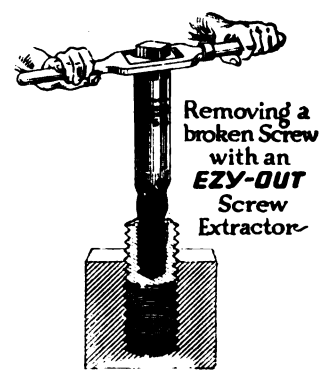
Manufactured by the B. F. S. Manufacturing Co., 54 Hermon St., Worcester, Mass.

The Burn Oil Device for attachment to the Ford car carburetor makes possible the use of kerosene. The engine is started on gasoline, then the three-way valve turned, kerosene admitted and the engine run on kerosene. In addition to this, water is admitted to the manifold through a needle adjusting valve. The whole device is simple and easily attached, the makers claiming a 50 per cent. saving on the cost of fuel.

Manufactured by Burn Oil Device Co., Inc., 129 N. Jefferson Ave., Peoria, Ill. Price complete, $30.

Ezy-Out sets, as the name implies, are designed for the extraction of broken screws, studs and other parts which are held in place by threads and which have their heads broken off so that the screw driver or wrench cannot be used in removing them. As the accompanying illustration shows these tools enable one to do a quick, clean job without loss of time or temper, as it is only necessary to drill a hole in the broken piece, insert the "Ezy-Out" tool and the broken section can be unscrewed on its own threads without endangering the threads in the original hole.

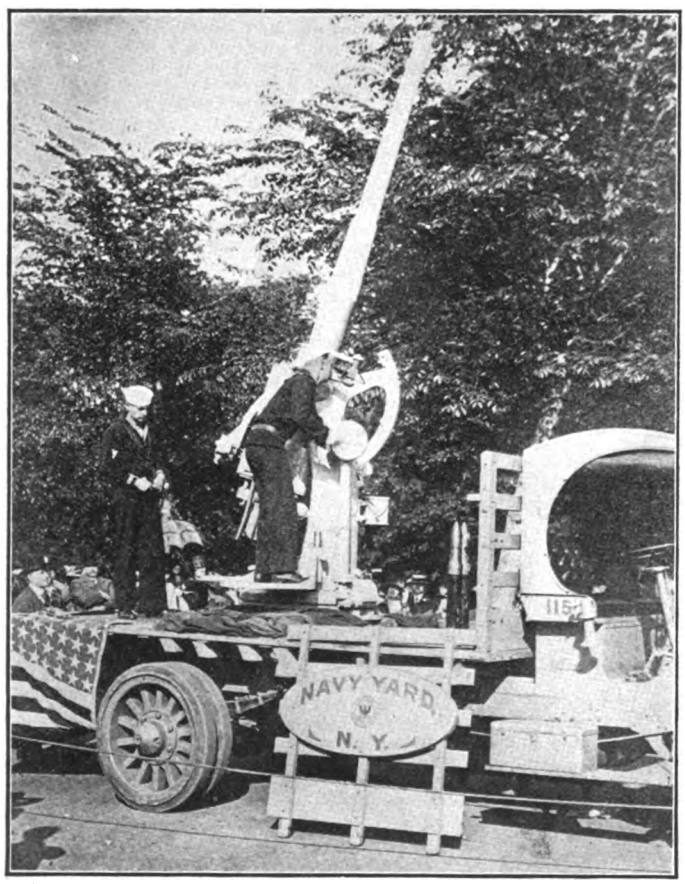
Manufactured by the Cleveland Twist Drill Co., Cleveland, O. Write for prices and literature.



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Trucks Mount Guns For Defense of Navy Yards

Mobile artillery that can be quickly moved and stationed wherever necessity shall require is essential for the protection of cities where there is reason to believe that attack may be made by enemy aircraft, and the United States government has made provision to safeguard different communities and necessary military and naval bases with rapid firing guns that can be trained at practically any angle.



Aircraft Defense Gun Mounted on a United States Truck for Use in Coast Protection Service.

The defensive equipment includes artillery mounted on the decks of heavy power trucks that has accurate range of three miles, and these guns are regarded as the best that ordnance engineering has produced. The accompanying illustration is of one of 17 United States truck chassis on which is mounted a gun unit, recently added to the defenses of the Brooklyn navy yard at New York city.

STUTZ MOTOR CAR CO. EARNS $5.30 A SHARE.

The statement of the Stutz Motor Car Co. of its earnings for the last six months showed a net profit of $398,066 as compared with $621,775 in the same period last year without allowance for the 1918 Federal taxes. These earnings are equal to $5.30 a share compared with $8.29 a share for the corresponding period in 1917. Net sales fell off $553,665, but costs declined only $331,753 Gross profits were $221,912 under those at the same time last year.

AMAZON RUBBER CO. TAKES OVER O'NEIL TIRE ACCESSORY BUSINESS.

A recent development of considerable interest in the tire world is the purchase of the tire accessory business of the O'Neil Tire and Rubber Co. by the Amazon Rubber Co. of Akron.

In discussing the matter L. J. Schott, general manager of the Amazon Rubber Co., stated:

"Mr. W. J. O'Neil was the pioneer manufacturer in his field and for over 10 years produced high grade line of tire accessories, which have enjoyed a nation wide distribution and have been decidedly popular with every dealer in the country.

"The purchase includes the exclusive right to the name 'O'Neil' as an accessory trade name, all unfilled orders on hand and the good will of their trade.

"We realize that there will now be a crying need for dependable tire accessories, which will enable the car owner to secure every possible mile of service from his tires, on account of the decreased production and the necessity of conserving the rubber supply of the country.

"We will conduct this new addition to our business on a much broader scale, and under the name of 'O'Neil Pioneer Accessories' will place before the trade the highest quality reliners, wing blowout patches, lace-on boots, cementless patches, etc."

BEARINGS SERVICE BRANCH AT BOSTON IN NEW HEADQUARTERS.

The branch service station of the Bearings Service Co. in Boston has been moved from 835 Beacon street to 19-23 Jersey street, where it will have more commodious quarters and will maintain better service facilities for cars and trucks equipped with Hyatt, Timken and New Departure bearings.

NEW PRICE LIST ON KISSEL PASSENGER CARS AND TRUCKS.

The Kissel Motor Car Co. has issued a new price list on the new Kissel passenger car and trucks models, listing the various models as follows: Kissel Silver Six four-passenger tourster, $2550; seven-passenger touring car, $2550; four-passenger speedster, $2550; Kissel Hundred Point Six five-passenger touring car (not built for "all-year top"), $1644.50; five-passenger Gibralter touring (built for "all-year top"), $1743.50; five-passenger "all-year sedan," $2128; three-passenger roadster, $1644.50; four-passenger roadster, $1743.50; four-passenger "all-year coupe," $2128; five-passenger Victoria with detachable town car top, $2475; four-passenger "all-year sedan," $2293.50; four-passenger sedan (equippel with new semi-Victoria top only), $1853.50; five-passenger staggered door "all-year sedan," $2293; Kissel trucks, general utility, $2073; freighter, $2832.50; heavy duty, $3905; "dreadnaught," $4785.

The "Any Kar" Auto Kot is a simple and effective means of converting a car into comfortable sleeping quarters. This cot rests on the top of the rear and front seats. A "U" shaped brace which is adjustable and has two curved plates that rest on the top of the front seat, supporting same and allows the canvas to be free. Two cots will fit into any five or seven-passenger car. Each cot will accommodate one person. The "Kot" is furnished with a heavy ducking that is laced on the under side, making it comfortable. It is hinged in the middle and folds to a small package and can be carried the same as a suit case while touring. The frame is made of ½-inch galvanized tubing, braced in two places to hold it rigid. When worn, the canvas can be replaced at little expense. The "Kot" weighs complete less than 15 pounds and will hold 500 pounds.

Manufactured by the Peoria Auto-Kot Co., Peoria, Ill. Price, $12 each, adaptable to any four, five or seven-passenger car.



Write for literature and descriptive matter.

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(Continued from Page 27.)

ground in, the light valve springs gave a very quiet valve action and the engine was very much better in regard to economy of fuel than our former engines.

"The acceleration on opening the throttle is remarkable and all these attributes are present and are very apparent to the driver of the car fitted with this engine, as compared with our 48 B-4 model. The acceleration is very much more rapid. The power is very much greater, hills that before necessitated a change of gear can be mounted on high.

"The speed of the car is much greater and the miles per gallon are much increased, and with all this the engine runs much cooler, so much so that the same size of radiator is almost too large for the new model.

"The dual valve six engine has dual valves. In other words, each cylinder has double intake and double exhaust valves. This enables a maximum explosive charge and a maximum scavenging of the cylinder. Thus equipped the engine develops 40 per cent. more maximum power and is 30 per cent. more efficient than previous similar sized engines.

"The acceleration from 10 to 60 miles per hour is 20 per cent. greater than in former models. While the car has 11 per cent. more speed, there is an increase of 11 per cent. in the miles yielded by each gallon of gasoline.

Production of Fords Is Suspended Entirely

The Ford Motor Company Will Devote Its Entire Facilities to Government Work.

The Ford Motor Co. has announced that production of Ford motor cars has been entirely suspended and that the company will devote its entire facilities to government work.

Henry Ford is now one of the largest producers of munitions in the country, having large contracts for Liberty engines, Liberty engine cylinders, helmets, ammunition carriages and Eagle boats, which will be used to chase the U boats from the seas.

RAILROAD ADMINISTRATION OPENS CONSOLIDATED OFFICE.

Furthering its policy of economy, the United States railway administration opened a consolidated ticket office in Cleveland, Aug. 12.

Centrally and conveniently located in the Hotel Winton building and next door to the entrance of Hotel Winton, this office handles tickets, Pullman reservations, etc., for all railroads in Cleveland. The formal opening was attended by city officials, representatives of railways, Chamber of Commerce and Chamber of Industry. In the accompanying illustration Mayor Davis is shown purchasing the first ticket. As a result of this consolidation the Federal railroad administration has ordered all other downtown ticket offices closed. An office force of 35 is necessary to handle the volume of business, which amounted to $15,000 the first day.

The consolidation affects the following roads: Big Four, New York Central, Erie, Baltimore & Ohio, Pennsylvania, Nickel Plate, Wheeling & Lake Erie.

Office hours are from 8:30 a. m. to 5:30 p. m. On Saturday the office closes at 1 p. m., after which hour tickets can be purchased only at passenger stations.



Consolidated Ticket Office in Hotel Winton Building at Cleveland, O.

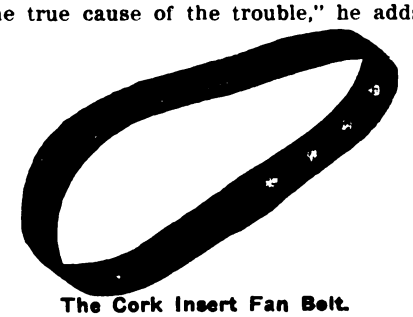
Fuel Administrator Garfield May Fix Price of Gasoline

United States Fuel Administrator Garfield has announced that he expects soon to fix a price for gasoline for consumers, as well as the government and the Allies, at a figure lower than the present market price. He is awaiting further reports on the situation before taking definite action.

Dr. Garfield's announcement disclosed the fact that for some time consideration has been given the problem of bringing the price of gasoline to a lower level. Several reports have been made to Mark L. Requa, director of the oil division of the fuel administration, and it was intimated that upon completion of the investigation now being conducted immediate action would be taken.

CONSTANT TIGHTENING RUINS ANY FAN BELT IN A FORD.

"The fan belt is a source of untold annoyance to many Ford owners and the biggest cause is—Mr. Owner himself." So says an official of the company that makes Cork Insert Fan Belts. "Perhaps the true cause of the trouble," he adds, "is that tightening the Ford fan belt is made too convenient. It is such an easy matter to tighten the belt a half turn that some owners get in the habit of doing it every time the hood is raised or every time they start out for a ride. This is done with the misguided notion that a tight belt is an efficient belt. The Ford owner knows that the water in his radiator frequently boils. He knows that this is often caused by a slipping fan belt. But there is such a matter as overdoing a good thing and the tightening up habit comes under that head. There is just so much stretch in a fan belt. Any belt when stretched beyond its normal limit is on the road to ruin. Its service from then on will be one of constan dissatisfaction. Cork Insert Fan Belts are designed to give perfect service without the need of their being stretched taut. If properly used they will not stretch and never will slip. In other words, they give perfect service when run quite loose. The looser you can run a fan belt the longer it will wear. We are even attaching pasters to Cork Insert Fan Belts giving just this kind of advice."



The Cork Insert Fan Belt.

An interesting booklet has just been issued by the Advance company telling about their transmission lining and fan belts for Fords, and a copy can be secured by adressing the Advance Automobile Accessories Corporation at 56 E. Randolph St., Chicago.

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War Industries Board Advises Suspension of Winter Shows

The War Industries Board has urged that all plans for automobile shows be abandoned for the coming winter. The announcement was made in a statement authorized by B. M. Baruch, chairman of the board. The statement is as follows:

The National Automobile Chamber of Commerce has cancelled the national automobile shows of 1919 to have been held during January and February in New York and Chicago, at the request of Bernard M. Baruch, chairman of the War Industries Board, and George N. Peek, Commissioner of Finished Products.

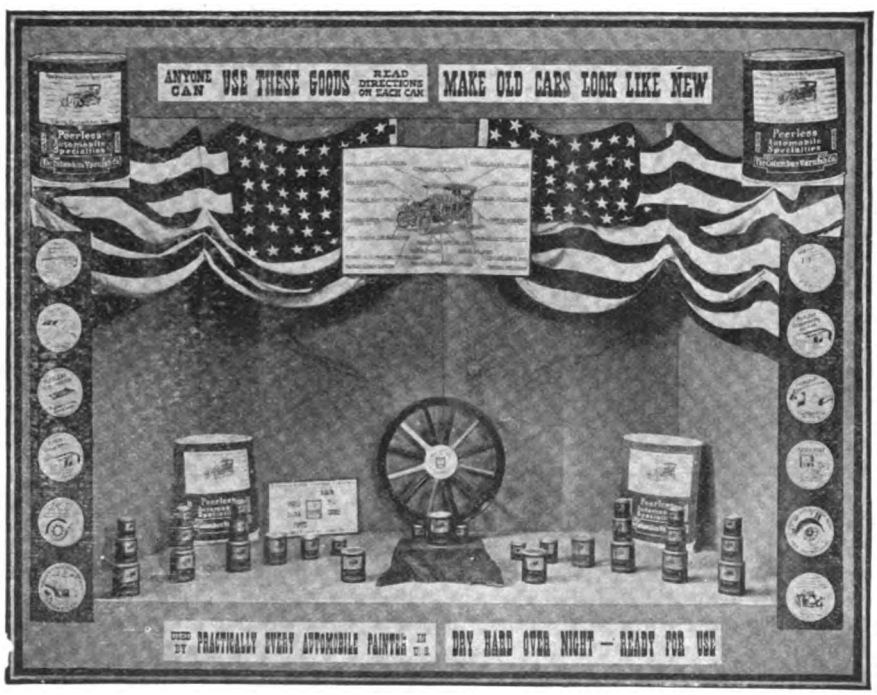
Going further to meet the views of the War Industries Board, the automobile industry leaders have urged promoters of local shows for automobiles, trucks or accessories to abandon all plans for such during the coming winter.

The reason given to the industry for this action by the Automobile Chamber of Commerce is a desire to cooperate with the War Industries Board in plans for conservation of fuel, labor and transportation.

The question of advisability and practicability of holding these shows, both national and local, was taken up with Messrs. Baruch, Peek, Alexander, Legge and Judge Edwin B. Parker of the War Industries Board, by Hugh Chalmers and Alfred Reeves of the National Automobile Chamber of Commerce, and Mr. Peek strongly urged that all such exhibitions be abandoned for the winter. Mr. Chalmers presented the views of the War Industries Board to his Chamber of Commerce and Mr. Peek has received from Mr. Reeves, general manager of the chamber, a letter stating that the directors of the chamber concurred unanimously in the opinion of the board and has adopted the following resolution:

"Resolved. That the promotion of national automobile shows during the winter of 1918-19, with consequent use of transportation, fuel and labor, would, in the opinion of this board, be inconsistent with the patriotic obligations of the industry and that, therefore, national shows be suspended until further action of the association.

"Resolved, That for reasons expressed in the foregoing resolution, promoters of local and other shows be respectfully requested not to hold automobile, truck or accessories exhibitions during the winter of 1918-19."



Suggestion for Window Display of Peerless Automobile Specialties, Made up of Cut Outs, Streamers, Signs, Wheel and Center Design Furnished by Columbus Varnish Company to Dealers.

WINDOW DISPLAY MATERIAL FOR PEERLESS SPECIALTY DEALERS.

The Columbus Varnish Co., Columbus, O., manufacturers of the "Peerless Automobile Specialties," are distributing their new fall window display matter, which is put out for jobbers, dealers, hardware and automobile supply houses. This material includes cut outs, streamers, center design, signs and wheel showing various colors, all of which can be combined in a very attractive display as shown by the striking window design in the accompanying cut.

Every live dealer in automobile supplies knows the value of artistic and strong window displays in moving his goods and any line of merchandise that is given this kind of support moves from the shelves far more rapidly than if left there to sell itself.

A TRUE CAR REFINISHER THAT AN AMATEUR CAN USE.

There has always been a demand for a satisfactory car refinish that could be used by the average man with good results, but nothing on the market seemed to fulfill these requirements, as most every article that would really renew the finish and give it the appearance of a new car called for the work of a skilled artisan in applying it and an outlay of money that few people wished to make on an old car or even on a new one.

Polishes, cleansers and restoratives do not really fill the exact requirements of the demand that calls for something that will practically duplicate a finish such as was on the car when first purchased, but that would not require the time, labor and cost that is incident to reproducing an absolutely new appearance. To meet this demand, after carefully analyzing the requirements of thousands of dealers and users for a product of this kind, the Panvar company of Philadelphia placed on the market, Panvar, a finish which not only restores the appearance of the body, wheels or any other highly finished part to its original luster and keeps it that way for a season, but one that can be applied by anyone who can use ordinary judgment in wielding a paint brush. It has a number of qualities, without which its application with skilled results would be impossible, as it is self-leveling and will, therefore, not show any streaks, brush marks or lapped coats, defects that would show up in any job of complete refinishing if done with ordinary material by an unskilled person. Having also a transparent quality it can be applied over any color, without dimming its hues, but enhancing their brilliancy to a degree equal to their original luster. This feature also tends to avoid the danger of making a sloppy job in its application as no harm is done where it is applied over other parts. It does not show on plated parts, yet serves as a rust preventive and if applied to tops acts as waterproofing. Age or exposure to light will not mar its effects, as it is guaranteed not to crack, craze, peel, discolor, turn white or flake off.

It dries hard over night, which makes it unnecessary to go to the trouble of providing a dust proof room in which to store the car until ready for use, as would be required in applying ordinary finishes where it was expected to obtain the same results.

Since its appearance on the market it has enjoyed a large and increasing volume of sales, a fact not surprising when it is considered that it possesses so many meritorious qualities and the ones that meet the demand of the times and the demand at this time for a refinisher for automobiles is greater than it ever was before and within the course

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of six months will increase amazingly, as practically every one of the 5,500,000 car owners will be directly or indirectly in the market for some means of keeping their cars in shape. There will be few if any new cars next year and whether a man intends to sell or keep his car he will want it in tip top shape, as its condition will affect its value and car values are going to be much higher.

Another factor in the phenomenal sales that this product has met is found in the price, which is negligible, a quart, which sells for $1.50, being sufficient to give one car a coat, and this is usually sufficient unless a finish has become very shabby. To a man who wants to refinish his car this price would not be a factor and its other exclusive features make it readily saleable if they are simply brought to the attention of the purchaser.

Many dealers already have stocked with Panvar, but the Panvar company to be sure that anyone interested gets an opportunity to test their product and prove to their own satisfaction why the company is so willing to give it a broad guarantee, will send a trial sample upon the receipt of 10 cents to cover the cost of mailing.

The Panvar offer to the trade is exceptionally liberal and more dealers can be taken care of.

WALKER-VALLANCE, LTD., HAMILTON, ONT., ENTERS JOBBING FIELD.

The firm of Walker-Vallance, Ltd., Hamilton, Ont., are notifying new accessory jobbing houses and manufacturers of automobile accessories that they have entered the jobbing field. W. C. Hunter has been placed in charge of the wholesale department and is assisted by a staff of salesmen.

STUDEBAKER CORP. WILL STOP PRODUCTION OF PASSENGER CARS.

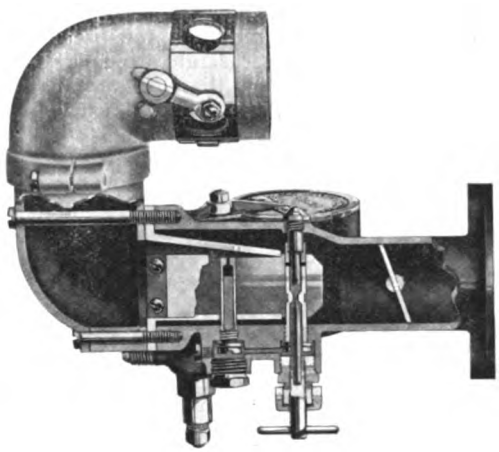
The Studebaker Corporation, South Bend, Ind., will cease the manufacture of passenger automobiles as soon as the present stocks of materials have been worked up. The company has large munition contracts, which will require practically all of its manufacturing facilities and employees.

PRINCIPLES AND ADJUSTMENT OF TILLOTSON CARBURETOR.

The Tillotson Carburetor, manufactured by the Tillotson Carburetor Manufacturing Co. of Toledo, O., is now being used on thousands of cars, a fact which has created great interest in its principles of operation and method of adjustment.

The principle of design of the Tillotson differs little if any from other carburetors on the market, except that the Tillotson air valve itself forms the restricted passage for the air passing through the carburetor.

The restriction at the small end of the valve is predetermined to equal the requirements of the motor at slow engine speeds, and at that point is located the primary fuel supplying nozzle, and that nozzle is provided with an adjustment. The secondary nozzle is located farther back and open to atmosphere so that no gasoline is drawn from the secondary at the slower engine speeds.



Tillotson Carburetor, Showing the Automatically Controlled Air Valve.

As the throttle is opened and the engine speed increases. the two flexible, yielding steel spring reeds open outwardly in proportion to the throttle. As the engine speed is increased the area through the air valve is increased in size, then the secondary nozzle commences to deliver fuel into the path of air at some open position of the throttle and continues to deliver fuel at all higher engine speeds and discontinues delivering fuel as the throttle is again closed and engine speed reduced.

The primary nozzle feeds the required amount of fuel at all slower engine speeds and reaches its maximum volume at a partially open throttle and continues to feed this maximum amount during the full range of engine speeds, therefore a single adjustment to the primary nozzle effects the mixture at all engine speeds.

The air valve having the proper restriction for slow engine speeds, and having its area equal to the maximum does not therefore need any adjustment, as the fuel adjustment is sufficient. The adjustment should be made very carefully and should be done when the motor is well warmed up and while the engine is running reasonably slow. Turn the adjustment of the primary nozzle up to the right just a little at a time, and keep turning it until the motor commences to slow down from lack of fuel, then turn it back about one, avoiding getting the mixture too rich.

Registration of Cars In Massachusetts For 1919 To Be Started In October

The Massachusetts Highway Commission will begin the registration of cars earlier than usual this fall. A total of about 500,000 plates have been ordered and it is expected that enough of these will be on hand so that the registration work can begin the latter part of next month. The commission will be ready to receive applications about Oct. 20 and will then make delivery of plates for 1919. As usual 5000 sets of plates will be reserved for present holders who wish to retain their old numbers.

Motorists are urged to apply for their plates as early as possible after that date to lessen the end of the year rush and to prevent the congestion in the mails at Christmas time of mailing thousands of plates. Under the new law the commission can make deliveries of plates by parcel post, but the applicant must pay the postage. The amount to be added to the registration fee to cover postage will be marked on the new blanks.

The new plates are considerably thinner than those now in use and it is estimated that fully 40 tons of steel have been saved by use of a lighter sheet metal than formerly. The new plates will have a blue background with white letters, a combination just the reverse of that at present in use.

DORT OWNERS USE CARS PRINCIPALLY FOR BUSINESS.

A recent canvas of Dort owners in the city of Detroit showed that 82 per cent. are using their cars wholly or principally in business and consider them indispensable.

"This represents about 850 Dort owners," says one of the Dort officials, "and it opens the mind to an interesting line of thought. We have no data as to just how much time these owners are saving by using an automobile in preference to other means of conveyance, but let's be ultra conservative and place it at half an hour daily. So then we have a time saving of 425 hours a day on the part of Dort owners in one city alone.

"On that basis these owners in the city of Detroit—which should be typical of this and other cities—save in a year of 300 working days, 127,500 hours.

"This, mind you, represents a saving by the owners of only one make of passenger automobile in one city. When you consider that there are about 5,000,000 cars contributing to the transportation facilities of this country, an appreciation of the indispensable utility of passenger motor cars cannot be avoided."

Barney Oldfield has been permanently suspended from the list of drivers permitted to participate in sanctioned meets of the A. A. A., and Al Cotey and Tom Alley were suspended indefinitely.

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Personal News of the Industry in Brief

Frank M. Eldredge, Detroit, has been placed in full charge of the sales and advertising department of the L. V. Fletcher & Co., New York. He has been handling all the national advertising for the company for the past year and will now take on the sales department.

Mr. C. C. Powell has been appointed advertising manager of the Buda Co., Harvey, Ill., manufacturers of the Buda engine for heavy duty trucks and farm tractors. For nine years he was advertising manager of the Northwestern Expanded Metal Co. of Chicago.

Gordon G. Atwell, Nacogdoches, Tex., has been appointed by the Van Spring Oiler Co. of Chicago, their southern distributor. The Van Spring Oiler Co. is located at 222 N. Wabash avenue, Chicago, and make a complete line of Van Spring Oilers for pleasure cars. They are now working on a complete line of Van oilers for the trucks of America and will show these at the Chicago show.

Bert B. Fornaciari has been appointed production manager and chief engineer of the Midland Motor Car & Truck Co., Oklahoma City. For nine years he was secretary and general manager of the Harvey Motor Truck Co., Harvey, Ill.

W. B. Burgess, formerly assistant to Mr. Fornaciari and in charge of cost, time and stores departments of the Harvey Company, has joined the Midland forces as assistant production manager.

L. S. Nold is now associated with the Mitchell Motors Co. as secretary and treasurer. He was formerly of the Electric Vehicle Co. and also the General Electric Co.

R. T. Hodgkins, for the past four years general sales manager of the Studebaker Corp. and previous to that connected with the Yale & Towne Mfg. Co., New York, has been appointed general sales manager of the Cleveland Tractor Co., Cleveland, O.



Frank M. Eldredge, Sales and Advertising Manager of L. V. Fletcher & Co.



Emlen S. Hare, Elected Vice President of Packard Motor Car Co.

Emlen S. Hare has been elected vice president of the Packard Motor Car Co., as announced by Alvan Macauley, president and general manager. Mr. Hare will retain his position as president of the Packard branch in New York, but will remove to Detroit within a few weeks.

"Mr. Hare's successful experience, coupled with the fact that he is by nature a co-operator, will make him a valued addition to our organization," said President Macauley in announcing the election.

Emlen S. Hare's rise in the automotive industry, and particularly in the Packard company, is one of remarkable nature. He joined the Packard forces as recently as Jan. 1, 1916, in the capacity of special sales representative of both the New York and the Philadelphia branches. His success in developing national truck accounts, such as the telephone, express, oil and large mercantile business, so distinguished him that within six months he was given supervision of the truck department of the Packard Motor Company of New York. A month later he was promoted to general manager, and two months later was made president.

Under his administration he increased the business of the Packard Motor Car Company of New York, expanded its organization of sub-branches for sales and service, developed its accessory business, reorganized its used car department, completed the Long Island service station and organized its staff, and, quite recently, met the war-born problems of the Packard's biggest branch with an insight and a forcefulness that singled him out for his latest promotion.

Glenn A. Sanford is now sales manager of the rim division of the Jaxon Steel Products Co.

Wallace C. Hood, formerly general sales manager of the King Motor Car Co., has joined with James Foster in the Foster-Hood Sales & Service Co., Detroit. They will conduct a garage.

W. V. Logan is awaiting a call to service in the Naval Aviation branch. He will be trained at the Great Lakes Station. He was formerly in the Goodyear Tire & Rubber Co. service in St. Louis and later a traveler for the same firm in Europe.

J. H. Morrill is now assistant chief engineer of the Buda Co., Harvey, Ill. He was formerly in charge of the engineering department of the Northway Motors Co., Detroit.

H. B. Garman has been appointed plant manager of the Michigan plant of the Steel Products Co. Mr. Garman was formerly superintendent of the Detroit factory.

A. W. Voege is now assistant to the general manager, Maurice Rothschild, of the Regal Motor Car Co., Detroit, Mich. After the war the company will reorganize to manufacture Regal automobiles again.

J. C. Manternach, formerly manager of the rim and tube division of the Standard Parts Co. of Cleveland, is now president of the American Welding and Mfg. Co. of Warren, O.

William S. Wolfe, assistant chief experimental engineer of the Goodyear Tire and Rubber Co., Akron, O., has entered the service of the maintenance division of the U. S. Government Motor Transport Corps, with headquarters at Washington, D. C. His six years' experience in tire development with the Goodyear company well equips him for his present duties in assisting in looking after the maintenance of all tires, rims and wheels in the Motor Transport Service.

John P. Franck has recently been appointed sales manager of the Guide Motor Lamp Mfg. Co., Cleveland, O. Mr. Franck, who was formerly in charge of sales in the automobile field for the Cleveland Varnish Co., Cleveland, O., will have entire supervision over the marketing of Guide Lamp products.



John P. Franck, Sales Manager of the Guide Motor Lamp Mfg. Co.

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Guy W. Morgan, former president of the Abbott Motor Corp. in Detroit, and who was in charge of the spare parts, tires and accessories for the original motor transport section of the United States army, has been appointed to similar duties under Colonel Glover in the new motor transport service.

E. S. Lee, Jr., has entered the service as first lieutenant in the motor transport service division and is stationed at Camp Holabird, Maryland. He was sales manager of the United States Motor Truck Co.

L. W. Coppock is now general engineer and chief in charge of production of the Lane Motor Truck Co., Kalamazoo, Mich. He was formerly actively interested in the organization of the United Truck Co. of Grand Rapids and the Higrade Truck Co., Harbor Springs, Mich.

H. F. Eidt is now in active service in France. He was a former member of



Wallace C. Hood, Partner in Foster-Hood Sales and Service Co.

the sales department of the Continental Motors Corp. of Detroit. Mr. Eidt is also connected with the Harper Hospital unit of Detroit.

W. H. Armstrong has retired from the Mitchell Motors Co. and has taken an interest in the Armstrong Foundry Co., formerly known as the Holbrook-Armstrong Iron Co. Eight years ago Mr. Armstrong went to the Mitchell company as office manager. He has been elected president of the Armstrong Foundry Co.

J. M. Dempsey has been appointed sales manager of the Cincinnati Specialty Mfg. Co., Cincinnati, manufacturer of the Automatic Extension Reel. He was formerly with the Standard Tire & Rubber Co., Boston.

J. E. Nield, who was formerly of the Hudson and Saxon companies, has been elected second vice president of the Trego Motors Corp. of New Haven, Conn., of which he has been manager for some time.

F. L. Miller is associated with the Anderson Forge & Machine Co., Detroit, as metallurgist. He was formerly connected with the Mitchell Motors Co. of Racine, Wis.



J. C. Manternach, President of American Welding and Mfg. Co.

Henry Abegg has been appointed to take charge of the radiator department and H. G. Wangolin in charge of the accessory department of the Modern Automobile Carriage Co. of Belleville, Ill.

Dr. Orrel A. Parker has been placed in charge of records under W. F. Parrish, chief of the oil and lubrication branch, supply section, in the office of the director of military aeronautics. He was formerly manager of the wheel department of the Hydraulic Pressed Steel Co., Cleveland, O.

W. F. Winkleman is now associated with the Heath-Duplex department of the McCord Mfg. Co., Inc. For the past 12 years he has been connected with the automobile business. Mr. Winkleman was formerly connected as special representative for the Liberty Motor Car Company.

George V. McMahan has been promoted to assistant general manager of the Remy Electric factory at Anderson, Ind. He was sales manager of the Detroit branch of the company.

Frank Jay has represented the Stanley car at Chicago for many years, as its middle Western representative, but is now located at Newton, Mass., where he



William S. Wolfe Enters U. S. Motor **Transport Service.**

has an important executive position at the factory.

L. Clyde Smith has been appointed assistant general manager and treasurer of the Detroit Waterproof Body Co., Pontiac, Mich.

Fred Cuter has rejoined the Maxwell forces as assistant to Harry De Bear and will assist in a truck selling campaign to be conducted this fall. Mr. De Bear is manager of the branch in New York city.

J. B. Bleiler has become associated with the Republic Rubber Corp., Youngstown, O., as special representative.

W. J. (Bill) Slater has resigned as pneumatic tire sales manager of the Firestone Tire and Rubber Co. to become general sales manager of the Williams Foundry and Machine Co., Akron, O., the largest makers of tire building and repairing equipment in the world.

Mr. Slater's connection with the Fire-



E. H. Broadwell, Member of War Service Committee of Rubber Assn. of America.

stone company covers a period of several years, during which time he was successively manager of advertising, sales promotion and pneumatic tire sales.

C. A. Spear succeeds L. S. Hallowell as New York state division sales manager for the Selden Truck Sales Co., Rochester, N. Y. Mr. Hallowell becomes affiliated with the Philadelphia Selden sales agency.

W. O. Kennington, who was assistant chief engineer of the Remy Electric Co., Detroit, has returned from the war front, where he is connected with the British Air Ministry.

J. J. Wright has been promoted to manager of the St. Louis branch of the Ford Motor Co. For the past two years he was manager of the branch at Memphis. Mr. Wright succeeds W. C. Anderson, who has been made manager of the assembly plant at Chicago. C. S. Williams of the Louisville branch becomes manager at Memphis. W. R. Johnson will continue as assistant manager in St. Louis.

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New York Inaugurates New System of Regulating Automobile Traffic

One of the most radical steps yet inaugurated by any city in the regulation of motor car traffic has been put into effect in New York City. Congestion of traffic on the main thoroughfares in that city had reached a point where it became necessary to take some drastic action and as a result the present plan was involved through which 10 thoroughfares have been limited to passenger vehicles only and 12 to the use of commercial vehicles only.

The thoroughfares designated exclusively for passenger traffic are:

Canal street, Lafayette street to the Bowery.

Lafayette street, Duane street to Astor place.

Fourth street, Lafayette street to West Broadway.

Lexington avenue, Twenty-third street to 125th street.

Vanderbilt avenue, Forty-second street to Forty-fifth street.

Fourth avenue (Park avenue), Astor place to 125th street.

Madison avenue, Twenty-third street to 125th street.

Fifth avenue, Waverley place to 125th street.

Seventh avenue, Greenwich avenue to 125th street.

Broadway, Chambers street to 125th street.

The thoroughfares designated exclusively for commercial traffic are:

First avenue, Houston street to 125th street.

Second avenue, Houston street to 125th street.

Third avenue, Fifth street to 125th street.

Sixth avenue, Third street to 59th street.

Eighth avenue, Abingdon square to 59th street.

Ninth avenue (Columbus avenue), 14th street to 110th street.

Tenth avenue (Amsterdam avenue), 14th street to 125th street.

Park Row, Duane street to Division street.

Bowery, Division street to Canal street.

Bowery, Grand street to Fifth street.

Centre street, Pearl street to Broome street.

West Broadway, Vesey street to Third street.

Hudson street, Chambers street to 14th street.

Trucks and delivery cars may deliver or receive goods on any of the passenger thoroughfares provided they enter and leave the restricted avenue by the nearest intersecting street.

In some cases the new rules will cause delay in delivery of goods and hardships to many merchants, which will be especially felt in Fourth avenue from Astor Place to 34th street, as the greatest part of the thoroughfare within those limits is the center of the silk, woolen and other textile trades. The Fourth avenue merchants have protested through the Merchants' Association against taking that part of the avenue out of commercial traffic use, and Commissioner Enright has been asked to modify the rules in respect to Fourth avenue and Lafayette street.

A permanently marked white traffic line has been laid in Fifth avenue just above and below 42nd street. The line is a border of white marble, about six inches wide, stretching across Fifth avenue at the building line mark on the south and north sides of 42nd street. Traffic was closed during the day on the avenue from 41st to 43rd street. The marble line takes the place of the former methods of marking with white paint the stopping limit for vehicles to permit pedestrians to cross. These painted lines did not wear well and vehicles frequently ran up close to the curb, adding to the congestion of pedestrian traffic. At the center of the marble mark and at the ends, level with the surface, thick glass plates have been inserted, which will show green lights at night, at the pressure of the traffic officer, making the dead line stop for vehicular traffic plain to drivers. Pedestrians will also be warned in crossing the avenue not to pass below the white marble line.

REAR SIGNAL LIGHTS AS FACTOR IN INSURANCE ECONOMY.

Insurance companies in giving a substantial sum off on theft insurance name the locks which may be used. It will be interesting to see whether the companies will accept other locks than are now being pushed on the market, and also whether they will take favorable action on the matter of collision insurance. K. G. Barkoot of the Chamber of Commerce building, Detroit, sole distributor of the Roedding Signal Tail Light, has appeared before several insurance heads to place the matter of reduction of insurance for collision policies, when the Roedding Signal Tail Light is used, squarely before them. Some promises of success have been gained and many have agreed to test the Roedding Signal Tail Light before making a decision.

FAMOUS ARCHITECTS MAKE DESIGNS FOR LINCOLNWAY.

Elmer C. Jensen, chairman of the Lincoln Highway Committee of the American Institute of Architects, has just forwarded to the Lincoln Highway Association headquarters designs for the rest station the association contemplates erecting at the eastern end of the Goodyear memorial section of the Lincoln Highway, on the Great American Desert in Utah.

Mr. Jensen, who is one of Chicago's best known architects, has conferred with many other well known members of his profession in the preparation of the designs for this rest station and the permanent memorial markers, which will be placed at the summit of Fisher pass and at both ends of the two memorial sections. The building itself will be long and low and in accordance with the rough character of the country, and will be planned to provide room for five or six tourist parties.

Through the active cooperation of the American Institute of Architects the story of the way in which the desert section of the Lincoln highway has been eliminated as a barrier on the transcontinental trail will be briefly told, in lasting form on the concrete and rock memorial markers to be placed at prominent points on the desert and pass.

PACKARD PLANT NOW ON 100 PER CENT. WAR WORK.

The plant of the Packard Motor Car Co. at Detroit has been placed on a 100 per cent. war work basis and its product will be confined to Liberty engines, airplane bodies, war tractors and trucks. The plant now comprises 61 buildings, which cover 56 acres of ground and gives employment to 12,000 persons.

During the period of war work the company will maintain service on the Packard trucks and passenger cars now in operation.

ADJUSTABLE EXTENSION FOR GEAR SHIFT LEVER.

Mellin's Adjustable Gear Shift Extension, as its name implies, is a reversible extension lever by means of which the operator, with a single arm movement, can shift gears easily and rapidly without changing position or moving the body. It brings control of the gearshift



lever to a position where it is handled with the same ease of effort as required to move the throttle, as the extension not only eliminates the need of reaching, but increases the leverage that is exerted. These extensions are made to fit any car and can be attached in a minute and adjusted to any position by simply setting the lock nuts tight. When ordering the make and model of car should be stated.

Manufactured by the M & H Novelty Co., 857 E. 24th St., Los Angeles, Cal. Prices, $1.25 to $2.

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UNITED STATES NOW MAKES ITS OWN CASTOR OIL.

The scarcity of castor oil, which for a time loomed large as an obstacle to this country's ambitious airplane programme and also seriously threatened the production of important leather substitutes, has been successfully overcome, according to recent government announcement.

When the insufficiency of the castor oil supply became apparent, 6000 tons of castor beans were imported and planted last spring in sections of eight southern states, California, Cuba, Hayti and San Domingo on government contracts. The result has been exceedingly gratifying, as the crop to be harvested next month will net more than 2,000,000 gallons of first grade oil. This amount added to the supply on hand will fill all industrial and medicinal needs for a year.

Castor oil is an essential factor in the building of airplanes with rotary motors. Hundreds of such machines are on the building schedule and motors of this type must have castor oil for a lubricant.

Thousands of gallons of castor oil are used yearly in the making of leather substitutes of the pyroxylin coated type, which since the outbreak of the war have performed invaluable service in releasing leather for the country's vital military requirements. The success of the experiment of planting castor beans in this country adds another paying crop to the list in the sections named, and, in all probability, in adjoining areas. It also relieves the United States of the necessity of depending on imports for its supply of castor oil.

GASOLINE BY AIR PRESSURE.

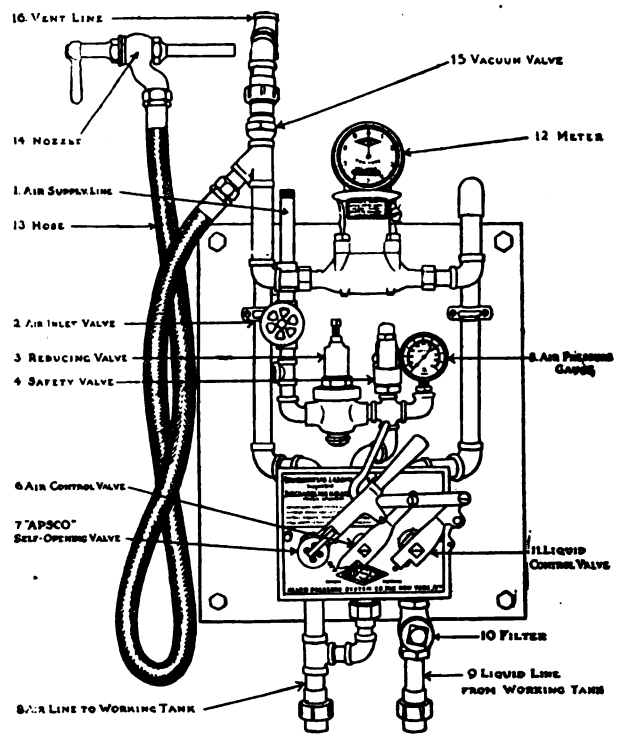
The Apsco storage and distributing system transfers liquid by means of air pressure, directly from storage tanks to any elevation of floors and thence to automobile tanks, vats or other receptacles. All liquid passing through the system is measured by an Apsco meter, tested and sealed by the Bureau of Weights and Measures of the City of New York. The system is simply constructed and operated. The measuring device has the precision of accuracy, with the possibility of any waste eliminated. One of the most important features of the system is that the storage tanks may be filled while the system is in operation and liquid may be drawn off at any number of points where draw-off panels are located at the same time. The system can be connected with any existing air pressure system in the garage. There is no possibility of wasting a drop of fuel, as when operator lets go of lever it goes back to the shut off position. The liquid cannot be left running nor is it exposed to the atmosphere at any point within the system, nor is there any opportunity for the liquid to vaporize or for gases to collect, thus saving the full strength and quantity of liquid, also eliminating the possibility of ignition and explosion.

The liquid remaining in the system when the flow is stopped is prevented from returning to the tank by means of a check valve, which assures immediate delivery of liquid when the next draw is desired. The working tank is set lower than the storage tank in order that it may quickly fill by gravity or syphonic action as soon as the air pressure is released. The liquid and air are prevented from escaping back into the storage tank by a trapped check valve, which closes the instant the air is applied and opens when the pressure is released. The storage tank is vented to the atmosmosphere at all times and the working tank is likewise vented except when the panel is in operation. Panels and tanks may be purchased separately and installed by local contractors, or the manufacturers of the system will furnish an estimate for installing. Each draw off panel is operated from an individual tank, any number of which may be connected to one or more storage tanks, and the system cannot be affected by the inactivity of storage tanks, providing one remains in service. The system has been approved by the National Board of Fire Underwriters, thus assuring the lowest possible insurance rates and absolute safety from fire originating at any point in the system.

Firmly grip self-opening valve (7), thereby closing vent line, then move handle to left as far as the stop; this opens valves 6 and 11, permitting air to pass through line (8) to top of liquid in working tank, creating a pressure upon same which drives contents up through line (9) from bottom of working tank, passing through filter (10), valve (11), meter (12), discharging through hose (13) and nozzle (14), into automobile tank or any other receptacle. When required amount has been drawn, move handle to right as far as the stop; this closes valves 6 and 11, shutting off air and discharge; then release grip, permitting valve (7) to open, allowing air to be released from the working tank, which escapes through the vent line (16) to outer air. This gives working tank an opportunity to refill. Should the finger grip on valve (7) be released when handle is in left position, the air would escape up through vent, thus automatically shutting off flow, as no liquid can be discharged unless grip is sustained.

The Apsco standard draw off panel is furnished complete with unions ready for connecting to pipe lines.

Manufactured by the Allen Pressure System Co., Inc., 16-24 W. 61st St., New York City.



"APSCO" DRAW-OFF PANEL

Lima, Ohio Junction of Lincoln and Dixie Highways

Lima, the only city in the country where the Lincoln and Dixie highways, the two greatest continental arteries of America, cross, has finally marked the junction of the two roads, which meet on the public square, in the exact center of the city.

A huge steel flag pole, 112 feet high, flying an American flag 36 feet long from its top, and, below, a service flag 20 feet long, with one blue star and the number 1345 and one gold star and the number 11, for the boys who have gone and the boys who have died, marks the junction point.

The pole is set in a concrete obelisk and on its southern face is a Lincoln Highway sign, in the distinctive colors used in marking that roadway, while the eastern face displays the Dixie sign.

Ten thousand people witnessed the dedication of the pole Labor Day. Two hundred and fifty soldiers, members of Liberty truck convoys, who leave Lima every week with Lima made Liberty trucks for the trip over the Lincoln Highway to the coast, formed a guard of honor.

NATIONAL AUTOMOBILE DEALERS' ASSOCIATION GETS MEMBERS.

The National Automobile Dealers' Association during the week ending Sept. 6 received applications for over 200 memberships, although no particular effort was made during that period to solicit new members.

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Highway Travel by Automobile Increased Fifty Per Cent. During the Present Summer

Highway travel by means of the passenger automobile has increased during the present summer fully 50 per cent., according to figures which have been compiled by the national road bureaus at the A. A. A. Washington and New York city headquarters. The increasing number of road journeys has resulted from overcrowded trains and the difficulty of assured accommodations and conveniences except to a comparatively limited number of travelers. While a percentage of the road trips have to do with vacation periods, a preponderating quantity has related to commercial necessities and a consequent saving in time obtained by uninterrupted door-to-door trips.

Director General of Railroads McAdoo has just issued a statement in regard to railroad travel, calling upon the public generally to use passenger-train service at the lowest possible minimum. Mr. McAdoo thus presents the case: "Among the many patriotic duties of the American public at this time is the duty to refrain from traveling unnecessarily. Every man, woman and child who can avoid using passenger trains at this time should do so. I earnestly hope that they will do so."

Chairman Carl G. Fisher of the A.A.A. Touring Board makes this comment upon Mr. McAdoo's plea: "With rail lines congested by essential freight haulage, it certainly is the duty of everyone to cut down his use of this utility, and, of course, the only answer is the highway and self-propelled vehicle, which now can show anew its ability to abridge distances and quickly transport people from one place to another in the necessary transaction of their daily duties.

"In the Middle West it is the expected thing for the average passenger car owner to employ his vehicle in practically all of his town-to-town journeys, whether they be within the state or into an adjoining commonwealth. The situation has demonstrated unequivocally the great need in every state of a state plan of state-built and state-maintained highways, and if the country as a whole were thus equipped at the present time, it would mean the saving of millions of dollars, which could be invested in Liberty bonds and other helpful forms of financing the great expenditures which we must meet.

"It is my belief that every American soldier who returns from France, after having personally seen and traveled over its great highway system, will be a forceful and persistent advocate to establish a similar situation in our country, even though it be many times the size of the prosperous nation which has benefited so thoroughly from the good roads wisdom of a certain Napoleon Bonaparte."

CASH REGISTERS AID DEALERS.

Merchants today are facing business conditions that are without precedent as a result of the war. No business can be successfully carried on along the old lines. It must be adjusted to meet existing conditions.

The merchants of the United States have for the last few months been facing the same conditions and struggling to solve the same vital problems that have been met and overcome by the merchants of Canada and England in the last four years.

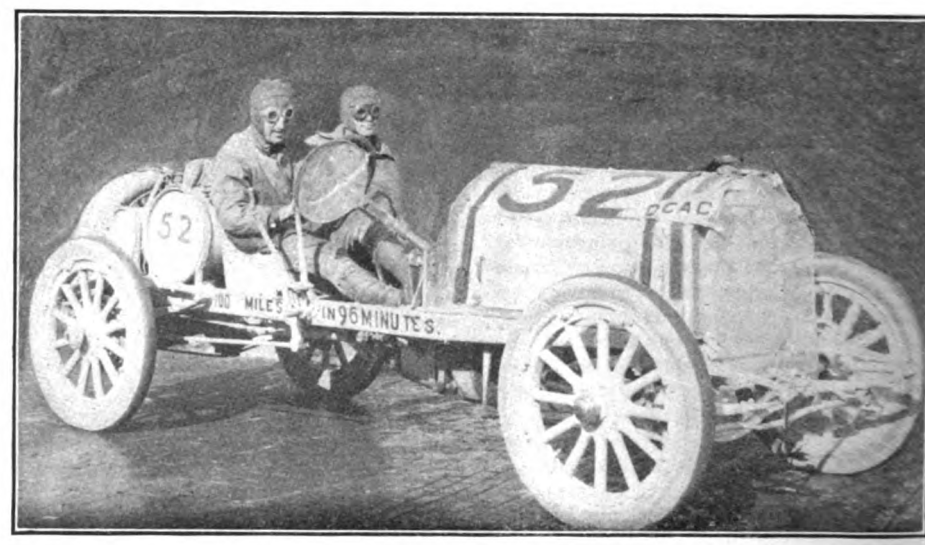
The Commercial Economy Board asks the stores of this country to conserve man power, materials and money, and to stop waste wherever it may be found. The things the government asks the stores to save and stop are the products of old, slow, wasteful methods. They are the very things that the English and Canadian governments asked the merchants of their countries to stop four years ago.

Merchandise, overhead and operating expenses have gone up and will increase still further. In order to maintain normal profits it is necessary to cut down expenses as far as possible, stop losses, avoid lost motion, eliminate waste and work faster. No store can hold on to the old, worn-out methods and operate at the speed that is required by the present day conditions.

The war has called thousands of trained help out of the stores—the new help is untrained. At the very time that the government is spending billions of dollars and everybody has work and money, so that business is unusually good, merchants have not enough trained help to handle their trade.

That is the present problem of the merchant. How can he carry on business more efficiently than ever before, meet bigger business with less help and avoid all waste? On the way he solves this problem depends not only the extent to which he will benefit by the coming time of general prosperity, but whether or not he can with justice feel that he is doing all in his power to help win the war.

This matter is of vital importance to the merchant. He owes it to himself as well as to his country to make certain that neither his time, goods, nor money are wasted. If he is to actively cooperate with our government in this crisis and at the same time benefit himself, he must conserve labor, eliminate waste and speed up his business. He can only achieve these results by having a more efficient system than he has heretofore used.



The Man Sitting at the Wheel of the Racing Car Shown Above Is Not a Doughboy Wearing a Gas Mask, but Leigh Lynch, the Well Known Sales Manager of the Columbia Motor Truck and Trailer Co., Pontiac, Mich. This Picture Was Taken When He Was Piloting Lighter Cars to Victory on the Speedways, a Game in Which He Was Also a Leader, Having a Number of Firsts as Well as Records to His Credit in Addition to the Distinction of Being the First Man to Drive 100 Miles in Less Than 100 Minutes.

There are two ways of learning, by experience and by observation. The least expensive way is to profit by the experience of others. The merchants of Canada and England found but one solution to this problem. That same solution has been found by progressive merchants of America. That is, labor saving machinery that will do the work of human hands. But labor saving machinery to do the work of human hands in a store must be able to do automatically a good many things that require both physical and mental effort on the part of clerks.

The cash register answers the require-

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ments. Many merchants have stated that only through the use of cash registers were they able to continue to do business at a profit. Stores that have cash register equipment have found it easier to meet the requests of the government.

With cash registers the clerk-wrap plan can be followed by department stores. This largely does away with the need of cashiers and wrappers. The register enables clerks to make more sales. It reduces deliveries. It helps to increase business without increasing the operating force. It makes every motion count and speeds up the whole organization. It makes it possible for the stores to operate with fewer clerks. It gives quick service, which increases "takes" and decreases deliveries. It saves clerical supplies and delivery supplies. It cuts down clerical work.

Cash registers do almost everything in their particular line except talk. They help to make first class clerks out of poor ones. They are so simple to operate that even an inexperienced clerk can make correct records by simply pressing the keys. The registers show how much business the clerks do, how many people they serve and how big their sales are. They not only make clerks quick, careful and reliable, but they are themselves mechanical clerks.

The clerks have fewer steps to take; they do not have so much writing to do; they can make two sales where before they made one. These are some of the reasons why merchants who are anxious to comply with the government's request to conserve man power, materials and money and to stop waste, have found greatest assistance in cash registers.

NASH MOTORS CO. CHANGES PRICES IN TRUCKS AND CARS.

The Nash Motors Co., Kenosha, Wis., has announced price changes in Nash passenger cars and trucks, which became effective Sept. 1 as follows:

Pasenger cars: Model 681, five-passenger. $1490; 681, seven-passenger, $1640; 683, four-passenger roadster, $1490; 684, six-passenger sedan, $2250; 685, four-passenger coupe, $2250.

Trucks: Model 2081, one-ton chassis, $1650; 3018, two-ton chassis, $2175; 4018, Nash Quad chassis, $3250. All prices f. o. b. Kenosha.

WRIGHT ROLLER BEARINGS FOR FORDS.

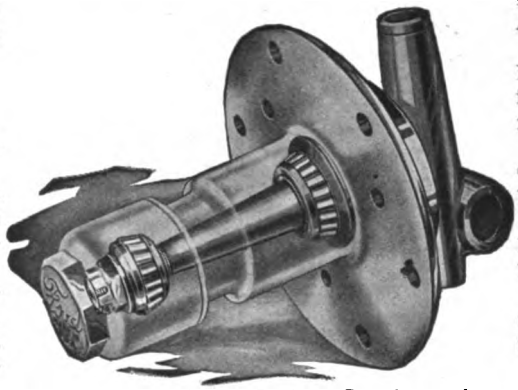
From the beginning of the idea of installing roller bearings in Ford front axles, a condition confronted all manufacturers which tended to ruin the bearings after a few hundred miles running, due to no fault of the bearing itself, but to the method necessary to mount the bearing in the axle.

It was found after actual use that the shoulder which held the ball bearing was not suitable for use with the roller bearing and hence it could not be held firmly. A tendency to cock on the seat after a short time was found, which ruined the bearing.

In order to overcome this difficulty the Wright bearing was redesigned and a new inner ring made in such a way that another seat is made which is at right angles to the outer face and which will fit any Ford.

This feature (on which patents are pending) is possible in the Wright design alone, as other types of roller bearing cannot use this ring without changing the entire design of the bearing itself.

This new point of superiority gives



Showing Wright Roller Bearings in Place on the Ford Spindle.

the "cageless" Wright bearing further leadership in the Ford field. It is sold by the National Bearings Service Co., Broad street and Girard avenue, Philadelphia.

DE PALMA SET SEVEN OFFICIAL RACE RECORDS FOR SEASON.

While no official championship award was made this year for automobile racing pilots, the finding of the Contest Board of the American Automobile Association shows that the performance of De Palma during the season easily places him at the head of all contenders, as he has seven official new track records to his credit as compared with four established by Louis Chevrolet, his nearest competitor.

The Contest Board has announced the following records, which have been allowed as official:

Non-competitive 10-mile record by Ralph De Palma at Sheepshead Bay Speedway, Aug. 24, in a Packard car. Time, 5:07.6. Official sanction No. 1103.

Competitive record, two miles, by Ralph De Palma at Sheepshead Bay Speedway, Aug. 17. in a Packard car. Time, 1:05.6. Official sanction No. 1099.

Competitive 10-mile record by Ralph De Palma at Sheepshead Bay Speedway, Aug. 17, in a Packard car. Time, 5:23.8.

Competitive 20-mile record by Ralph De Palma at Chicago Speedway, July 28, in a Packard car. Time, 10:50.2. Official sanction No. 1097.

Competitive four-mile record by Louis Chevrolet at Chicago Speedway. Sept. 3, 1917, in Frontenac car. Time, 2:14.22.

Competitive six miles by Ralph De Palma at Chicago Speedway, Sept. 3, 1917, in a Packard car. Time, 3:21.1.

Competitive 15 miles by Ralph De Palma at Chicago Speedway, Sept. 3, 1917, in a Packard car. Time, 8:18.9.

Competitive 25 miles by Ralph De Palma at Chicago Speedway, Sept. 3, 1917, in a Packard car. Time, 14:12.72.

Competitive 75 miles by Louis Chevrolet at Chicago Speedway, Sept. 3, 1918, in a Frontenac car. Time, 42:40.28.

Competitive 50 miles by Louis Chevrolet at Sheepshead Bay, Sept. 22, 1917, in a Frontenac car. Time, 26:57.3.

Competitive 100 miles by Louis Chevrolet at Sheepshead Bay, Sept. 22, 1917, in a Frontenac car. Time, 54:20.98.

Dirt track records—Non-competitive: Barney Oldfield in an Oldfield Special-Maxwelton, one mile circular track at St. Louis: One mile, 45 seconds; two miles, 1:30.4; three miles, 2:17.6; four miles, 3:05.6; five miles, 3:53.6; 10 miles, 7:56.2; 15 miles, 12:00.8; 20 miles, 15:52.2; 25 miles, 19:57.6; 50 miles, 40:47.6.

The Contest Board has decided that fuel tests will be permitted only when they are laboratory tests held in a laboratory and by a technical man appointed by the chairman.

Red Cross Wants Men With Automobile Experience To Drive Trucks And Ambulances Overseas

The Automotive and Mechanical Section of the American Red Cross, a recently created department under the direction of Major H. P. Harding, has issued a call for 1500 men with some mechanical knowledge to drive trucks and ambulances overseas.

A course of three to five weeks will be given in the training camp located in Chicago, comprising military discipline and mechanical schooling. Immediate entrainment for overseas duty will follow completion of training.

Major Harding states that while mechanical training is helpful, it is not absolutely necessary. The ambitious man who will knuckle down to hard work for a few weeks can acquire sufficient knowledge to efficiently perform his duties if he can now drive a car. Special appeal is directed to garage and repair men, dealers and all men in the automobile industry. Monthly allowance and maintenance will be paid after date of sailing; half pay and maintenance while in training. It is very likely that this quota will be quickly filled and it is suggested that those desiring to get into this branch of the service get their applications in as early as possible.

Headquarters are at room 528 People's Gas Building, Chicago, Ill.

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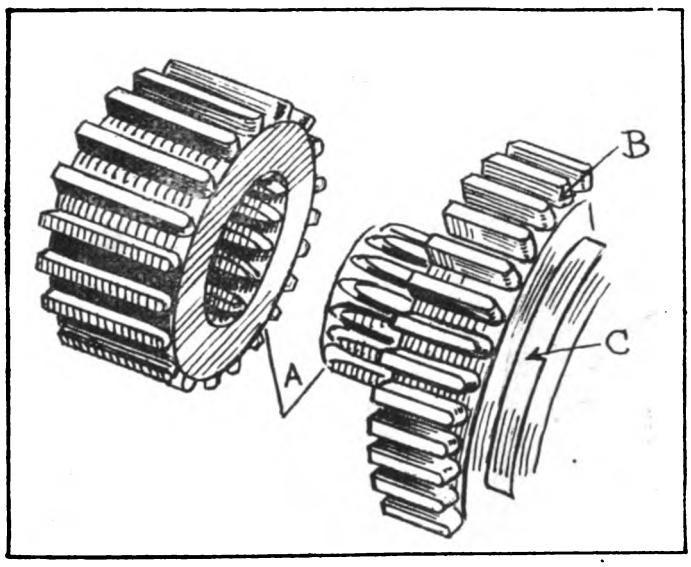
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with each rear wheel; then, with both wheels jacked up and with clutch in, while an assistant turns one wheel, the effect upon the other wheel should be noted. Any lost motion in the differential is liable to cause trouble, because there is "backlash" every time the car is started or brought to a stop, thus straining the gears.

While the rear wheels are jacked up test the condition of the brakes. Apply the emergency brake and see whether either of the wheels can be turned. Throw in the service brake and make the same test. If the brakes are loose have them adjusted for rigid application.

Testing the Steering Gear.

Between the steering wheel and the front wheels there should be little or no lost motion. Some manufacturers adjust their steering gears so that there is a slight amount of lost motion, but for safety there should never be more than three-quarters of an inch play in the steering wheel, which admits of easy steering. Examine the steering column and be sure that it is not cracked or broken, as well as examine the castings and bracings for breaks. The steering gear linkage should be carefully inspected and if badly worn at any joint, inquiry should be made relative to possibilities for compensation for wear at the various points. Have an assistant stand with one foot against the wheel, rocking it back and forth, noting whether the spindles are loose and whether there is much wear in the wheel bearings.



Worn Transmission Gears: A, Worn Teeth That Cause Loose Engagement; B, Burred Teeth That Cause Clashing; C, Worn Shift Yoke May Cause Teeth to Rub.

Wheel Alignments and Springs.

Severe strains or shocks upon the chassis might throw the rear or front axles out of line and result in excessive tire wear, difficult steering and other troubles. Two long sticks and two lengths of string make up the apparatus for detecting wheel misalignment. The strings are fastened to each end of the two sticks, equidistant from each other, sufficiently far apart so that they do not quite touch the wheels. The strings should then be set parallel with the rear wheels and when so set should be parallel with the front wheels if the front wheels are set to a point straight ahead. Another test for front wheel alignment consists of measuring the distance between the front of the wheel and comparing this distance with a similar measurement taken from the back of the front wheels.

Turning to the examination of the springs and their suspension, each spring and leaf should be examined, both from the front and back, as a cracked leaf might show from one side, yet not be seen from the other.

Disconnect one of the secondary or spark plug wires and start the engine, running it at about normal speed. Hold the wire away from the engine casting about one-quarter of an inch; if the spark is sufficiently strong to jump this gap, then it is usually sufficiently strong for ignition purposes.

If the car is equipped with a storage battery and a lighting system, with an ammeter for indicating current furnished and used, with the engine running at normal speed, the ammeter should indicate "charge," providing there are no lights being operated. As the lights are turned on the needle will drop back toward the zero mark. Most of the cars now on the market are equipped with generators of such a capacity that they will furnish enough current to operate all the lights in the original equipment without drawing on the storage battery. In this case the needle will not drop back to the discharge side of the ammeter until the engine is either run below normal or stopped.

Ascertaining Condition of Battery.

First, be sure that the cells are not cracked or broken. If the battery is one of the types that is fitted with a removable top, take the top from the battery and note the condition of the plates. In a fully charged battery, when the plates are in good condition, the positive plate is chocolate colored; the negative, gray. As the battery is discharged the plates become sulphated. This condition is evidenced by a white deposit on the plate surface, increasing in density as the battery is discharged. Excessive sulphation near the tops of the plates is an indication of air exposure, which condition results in a material lessening of battery capacity.

Before beginning the road test see that the electrolyte is brought to the proper level as directed by the manufacturer, by the addition of distilled water. After the road test take a hydrometer reading of the electrolyte. The specific gravity of the electrolyte is proportionate to the voltage of the cell, and with a specific gravity of between 1.285 and 1.300, according to the make of the battery, the voltage should be at its maximum (approximately two volts per cell). Specific gravity readings below this figure indicate partial discharge, the drop being uniform with the voltage.

Condition of Tires.

As the size of wheels increase the cost of tires increases; therefore, the value of the car is greatly affected by the condition of the tires. Extremely white and "dead" rubber is the result of age, and resiliency is lacking. Many fine short cracks on the sides of the tire indicate weak walls; long cracks that follow the outline of the rim are caused by underinflation or running on flat tires, and such a condition depreciates the tires very rapidly. Air bubbles, sand blisters and the separation of the tread from the fabric mean that the life of the tire will be short.

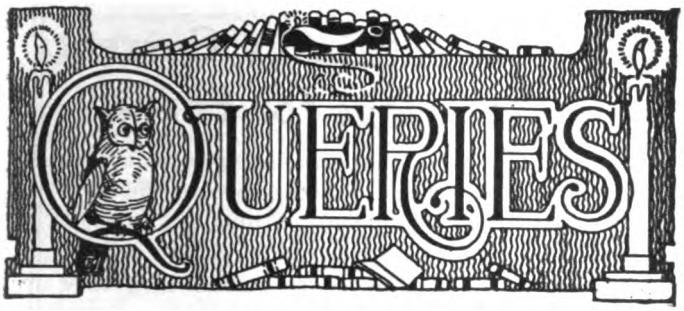
The general body and chassis condition may be tested by standing with one foot on the running board, holding to the seat or top and swaying the car body back and forth. This test will indicate whether the chassis and body are together tightly, whether the general resiliency of the springs is good and if there is play how much time must be spent in tightening bolts, fenders, etc.

Details of Road Test.

If the car has successfully passed the inspection up to this point, it should be given a thorough road test at a moderate speed. Many of the defects that may be hidden from the eye proclaim themselves loudly to the ear. On this test take along an oil can and oil squeaking parts. Lubricate the springs, tighten the fenders if they are loose. If a knock is heard do not be satisfied with the explanation that it is a loose member: have the noise eliminated, then there will be no doubt as to the source of that particular sound. If it is impossible to get from one speed to another without causing the engine to labor or pound, it is a sure indication that there is a lack of power, or that there is an unnecessary amount of friction.

After the car has gained headway and the high speed gears have been engaged, it should be possible to throttle down to a speed of five miles an hour or less on level ground without causing the engine to skip, misfire or knock. At this low speed many of the defects that might remain unnoticed at any other time are noticeable. Now suddenly open the throttle two or three notches. The engine should respond immediately and acceleration should be accomplished without causing the engine to choke or knock. The performance of the car on a steep grade is largely a matter of comparison, and calls for judgment on the part of the prospective purchaser. If properly handled and the spark lever advanced or retarded in conformity with the car and engine speed, the engine should not knock until its speed is far below normal.

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NOTICE TO READERS

In this department the Mechanical Editor answers all inquiries sent in by readers concerning any information as to the repair, maintenance, adjustment, use or abuse of the motor car or any of its parts. The service is free to every subscriber. Letters should always bear the writer's name and address, and the car, part or trouble which is the subject of the inquiry should be carefully identified and described. Be sure and give name and model of car about which an inquiry is made.

Any interesting letters received, bearing on timely subjects as to the maintenance and operation of motor cars or describing new and practical suggestions for the car owner or motor mechanic, if published, will be paid for at space rates.

Address all communications to the Mechanical Editor.

WHAT TIRE TOOLS AND TIRE REPAIR EQUIPMENT-MENT DO YOU CONSIDER ESSENTIAL FOR THE CAR AND WHAT IS THE BEST WAY TO USE THEM?

(L. E. Masters, New York City.)

Best Letter.

I have toured many thousands of miles over all kinds of roads and have never yet been actually stranded through tire trouble that could not be remedied in a few minutes. This freedom from trouble has been partly due to my forehanded precautions, as well as to the fact that I always carry what I consider the necessary tire supplies and equipment to meet any emergency. I never start on a long journey without a spare tire if the shoes that are on the wheels have been run over 3000 miles, as I have found by experience that through the use of inside tire patches or complete protectors that a casing run under that number of miles can be fixed up with either the patch or protector to run to any point necessary to obtain a new casing. It has been my experience that shoes run up to 3000 miles and have not been badly cut will not blow out with such a bad tear but what they can be repaired for an emergency with either of these methods.

Frequently I have inserted tire protectors in old shoes and secured from 500 to 1000 additional miles of use from them. The secret of getting tire service I have found lies mainly with giving instant attention to every cut or puncture. When I receive a puncture or bad casing cut the attention they will receive will depend upon the need of haste. If in a hurry I will patch the tube with one of the quick working patches that require no heat or cement, or cover the cut with a boot which laces on, these repairs serving until I can get the time to vulcanize them. When I have plenty of time on the road I always stop and spend the 20 or 30 minutes required to permanently vulcanize the casing and tube cut, for which purpose I carry one of the small vulcanizers now sold, that can be used for either purpose and which occupies but a small space in the tool box and needs only the prepared heating substance that comes with it.

There are several good tire tools sold for removing tires that save time and labor and a place for them should be found in the kit in addition to several inside tire patches, protectors, prepared patches, rubber for vulcanizing and a vulcanizer that can be used instantly for either casing or tube.

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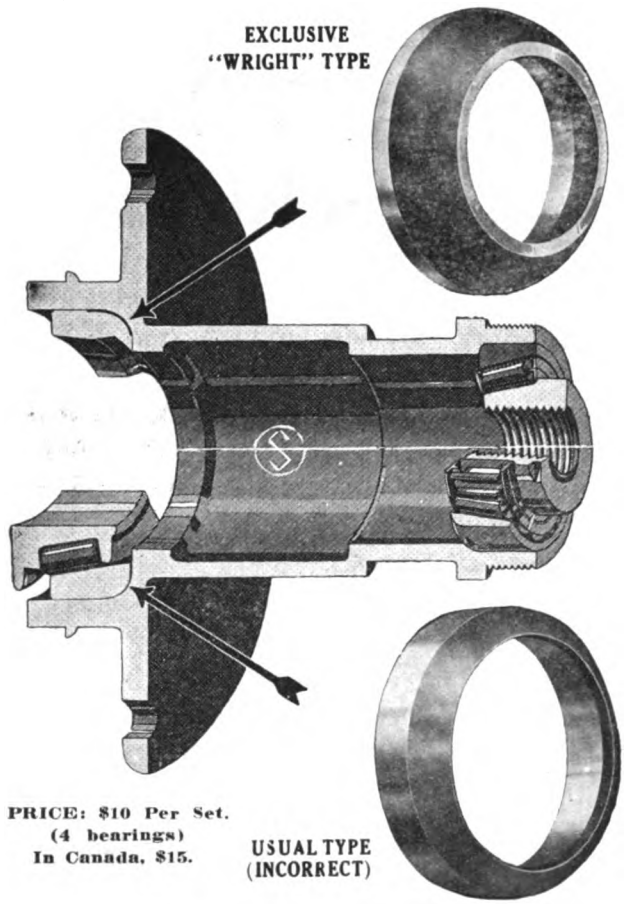
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PLAY IN STEERING GEAR.

(J. H. S.. Cambridge, Mass.)

I have a second hand Regal car fitted with a worm and worm wheel type of steering gear in which there seems to be quite a little play. This play I think is in the worm and wheel housing. Should it be taken up by adjusting the nut on top of the housing?

If your car is a model 4-32 the lost motion in the steering wheel is probably caused by the fact that the adjustment nut does not fit tight enough upon the top thrust bearing of the worm. To adjust this it is only necessary to unscrew the lock nut and turn the adjusting nut to the right until the play is taken up. Do not turn this nut so far as to cause a bind.

TROUBLE WITH FORD IGNITION.

(H. E. J., Hartford, Conn.)

My Ford will not run when the wire from the magneto is attached in the usual way to the magneto terminal on the dashboard. It will, however, run perfectly when the wire is changed onto the battery terminal on the dashboard and the switch turned to the battery side, though there is no battery connected to the terminal. Could you tell me if the trouble is in the coil box?

There is probably some fault in the connection between the switch and the magneto terminal on the dashboard. The switch and magneto terminal connections on the dashboard and between the switch and the accumulator terminal on the dashboard are similar. If the connection between the switch and the accumulator terminal is in good order it does not matter whether the accumulator cable or the magneto cable is attached to the accumulator terminal on the dashboard. The trouble probably rests with the contact pieces of the switch, which are easily examined. Very often owing to wear the moving member either refuses to make contact or declines to break it.

CARE OF MAGNETO WHEN CAR IS LAID UP.

(K. E. B., Worcester, Mass.)

Is it advisable to remove the magneto when I lay my car up for the winter? Last year I did not take this precaution and had considerable trouble with the magneto when I put the car in service last spring. I would also ask the same question regarding the storage batteries.

It would be advisable to remove the magneto from the car if you intend to lay it up this winter unless the garage or place where you intend to store it is very dry or will be heated thoroughly. Put the magneto in a dry place, for if exposed to dampness, such parts as the high-tension collector and distributor become coated with moisture and in the contact breaker the fiber brush is liable to swell so that a little difficulty might be experienced in starting up the engine when—at the end of the war!

If it be preferred, however, to leave the magneto alone when laying up the car, it should be borne in mind that some such difficulty in starting the engine in the future might possibly be caused by dampness on the magneto. Such dampness, however, formed in the winter, would probably dry off in the summer, and the same applies to moisture on the lighting dynamo and engine starter, if such electrical details be part of the car's equipment.

As to the batteries, one approaches the most difficult problem of all. If the batteries be left untouched for 12 months for instance, they will probably be ruined at the end of that time, and their condition will be fairly bad if they are only occasionally attended to over a period of 12 months.

CLEANING THE BATTERY.

(A. L. S., Boston, Mass.)

Can you inform me as to how I should proceed to clean out my storage battery and as to whether it would be advisable to turn it up and drain it thoroughly before cleansing it with a hose. Considerable sediment has collected at the bottom and I believe the battery would work better if it were removed.

Turning the battery upside down to remove the sediment

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would probably injure it. The sediment collected at the bottom is lead peroxide that has been "shed" from the positive plates and precipitated.

If the battery were inverted to pour out the electrolyte the sediment would be washed between the plates and separators and around the plates so that short circuits would result. No washing that would be practical would insure the removal of the particles from the plates, and in the event of renewal of the electrolyte particles remaining on the plates would result in local action—each particle having a polarity opposite to that of the plate on which it would be fixed, and in forming in each instance a miniature cell in which charge and discharge would alternate, as between positive and negative plates. Eventually holes would be pierced in the plates from this action.

There is but one way to clean the sediment from the cells and this work should not be undertaken by one not experienced in battery repair. It is the removal of the plates from the cells, thoroughly washing the plates and jars, renewal (if necessary) of the wood separators and reassembling.

Before this is done the battery should be fully charged, which means that it should be charged until there is no rise in voltage or specific gravity of the electrolyte over a period of half an hour.

The battery cells have two terminals each and these cells are connected by different type connectors, some being what is known as "bolted" and others being "burned." The process of "burning" is really that of fusing and when the terminals are burned there is no joint, the metal flowing together.

In disassembling cells with burned connections of the pillar posts, holes are drilled with half-inch drills where the pillar straps are burned to the pillar posts, and the connectors may then be lifted off. Another method not so satisfactory is by cutting the connectors between the pillars with a hack saw.

Bolted connections may be unscrewed and require no drilling or cutting. If the tops of the cells are sealed with soft rubber gaskets the gaskets may be removed and the covers taken off. If sealed with a hard compound the compound may be softened and removed with a heated putty knife.

When the elements or plates are exposed one series of plates should be removed at a time and placed on its side with the plates vertical. These can be washed with a stream of water and any deposit on the plates that the water will not remove should be scraped off with a stick of wood.

The wood and rubber separators should be removed and if they are cracked or broken or rotted they should be replaced with new, otherwise they may be used again.

Immediately upon washing the negative plates should be placed in distilled water, for if exposed to air they will absorb oxygen and heat, and if the battery is not to be immediately reassembled they should be placed in electrolyte. The positive plates will not heat when exposed to air.

Assembling the battery, assuming the jar and the separators of each cell have been thoroughly cleaned, the element is placed with a positive plate between each negative plate, and the separators are placed with one rubber and one wood between each plate. The rubber sheets contact with the positive plates and the flat sides of the wood separators contact with the negative plates.

The bottoms of the plates and separators should be even. The plates and separators should be pressed together and squared with each other so that the assembly can be placed in the jar and seated on the bridge at the bottom. The hold down, the rubber or wooden pieces that were between the tops of the separators and the straps connecting the plate lugs should be placed, the purpose of these being to prevent the separators rising and insuring against short circuiting at the bases of the plates. The covers of the cells are then put on and resealed.

The electrolyte should be placed in the cells before the covers are put on and this ought to be about 40 points higher in specific gravity than the electrolyte that was in the cells before they were disassembled. This increase of gravity is to compensate for the water in the wood separators. If the old wood separators are used, however, the specific gravity should be the same.

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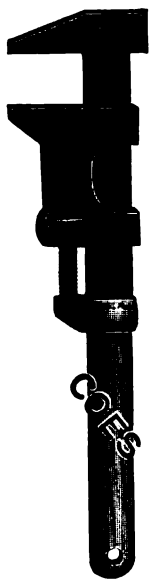


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After the covers have been put on the cells may be temporarily connected. The plates and wood separators will absorb some of the electrolyte, so the plates are well covered.

The greatest of care must be observed to connect the positive poles of the cells with the negative poles of the adjacent cells, leaving a final and outer positive and negative terminal for the line connections.

The connections must be either burned, or if the bolted type, the pillars, connectors and nuts must be coated heavily with vaseline to prevent corrosion.

The battery must be then fully charged and the electrolyte brought to the required specific gravity. The battery should then be charged at a rate not exceeding one-fourth of the normal discharge rate, and this should be continued until both the voltage and specific gravity reach a maximum, and to be sure that this maximum has been obtained the readings should be alike for a period of not less than 10 hours. There should be an allowance for temperature variation, for the specific gravity will decrease one point for each three degrees rise in temperature and it will correspondingly increase for each three degrees fall in temperature.

The maximum gravity will be approximately 1.280 at 80 degrees Fahrenheit, and the maximum voltage should be between 2.55 and 2.70. Upon completion of the charge the height of the electrolyte should be adjusted to about one-half inch above the tops of the plates. The battery will not have its maximum capacity until it has been charged and discharged three or four times, when the specific gravity of the electrolyte should be adjusted to be approximately 1.285 when fully charged.

The restoration of a battery is a very delicate operation and in most cases it is most practical for the owner to have the work done at a battery station. Unless the most careful attention is given the work the results will be disappointing.

TIMING THE SAXON ENGINE.

(E. H. S., Bristol, Conn.)

I recently purchased a 1915 Saxon roadster and as it had been used quite extensively a number of troubles have developed. The engine gets very hot when running and lacks compression. I examined the cylinders, pistons and rings and do not find anything the matter with these parts that would explain the trouble. Could you also advise me as to how the engine should be timed?

It would appear from your statements that faulty valves or incorrect timing was responsible for the engine trouble.

Run the engine long enough to heat it up and then examine the valve clearance. The distance between the valve stem and valve lifter or tappet should be approximately equal to the thickness of a visiting card. If it is more than this the exhaust valves will not open sufficiently to allow a rapid escape for exhaust gasses and overheating will result. If it is less than this the valve may be held open at all times, resulting in lost compression and overheating.

This clearance should be measured immediately after the valve has closed. Turn the engine over with the hand crank until the first valve at the front of the engine has raised to its uppermost point, then downward until it is free from the tappet, then make the measurements. Do the same to every valve.

With the engine running at normal speed insert a screw driver between the valve spring coils and give it a slight twist so as to bring tension upon the spring. Should this procedure have an effect upon the running of the engine a new valve spring should be put in. All valve springs should be tried in this manner.

Failing to locate the trouble in either the adjustment or

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springs the valve timing should be checked off. If you look on the flywheel you will notice a number of letters, which have reference to the valve positions. Turn the engine over until the mark Ex. Cl. is on the top and directly beneath the pointer. The exhaust valve in one of the cylinders should be just closing. If this is not the case the timing gear must be removed from the camshaft and the camshaft turned in an anti-clockwise direction until the exhaust valve in one of the cylinders, which has a piston near the top of the stroke, is just closed, then the gear should be returned.

To check over this timing turn the flywheel until the mark In. (inlet opens) is at the top of the flywheel and under the pointer. The inlet valve in one of the cylinders should start to open. (The piston in this cylinder should be near the top of its stroke.)

The valves should next be inspected and should the faces or seats seem to be pitted, chances are that the leakage is through them. They should be ground into place by the use of grinding paste and a screw driver, taking care not to allow the paste to work into the cylinders or valve guides.

A frequent cause of compression leakage can be traced to spark plugs. The plugs should be coated upon the threads with a paste made of graphite and oil and screwed tightly into the cylinders. The compression union or nut, which fastens the porcelain into the plug body should be examined and screwed up tightly.

Compression leakage at gaskets, plugs, etc., may be located by putting oil upon the joints with the engine running and if bubbles arise it is an indication of leakage.

EXPLANATION OF THE FORCE FEED OILING SYSTEM.

(G. F. M., Lowell, Mass.)

Please explain the working of the force feed oiling system in the Query Column of the Automobile Journal.

In this type system the oil is forced by pump pressure direct to the main shaft bearing, thence through drilled holes in the crank webs to the crank pins. The wrist pins, pistons and cylinders are supplied by oil thrown from the lower ends of the connecting rods. The connecting rods do not dip in the oil. The oil returns to the sump, or the reservoir, and is again circulated throughout the system.

TROUBLE WITH ELECTRIC STARTER.

(W. W. S., Pawtucket, R. I.)

At times my starter will not work, and again it starts at once. The wiring seems to be O. K., but mechanics do not seem to be able to remedy the trouble. It gives the effect as if the current was cut off and then suddenly starts again.

Cases of this kind have been noted where the trouble was due to one of the cables shorting against a metal part of the car. The wiring should be carefully gone over to see if any part of it is frayed or broken. Switches do not make contact on occasions. Is your battery all right? Look over the starting motor brushes and commutator.

PROPER WAY TO FIT A TUBE.

(F. C.. New York City, N. Y.)

Please explain the proper way to fit a tube into a tire. I have had several pinches of late and believe this is due to ignorance upon my part in not understanding the proper way to insert and inflate a tire.

When fitting a tire, if the tube is pinched between the bead of the casing and the rim, the invariable result is an explosion of the tube. This explosion usually forces the bead out of the clinch of the rim at the point where the rupture occurs. The inference is then drawn that the envelope did not fit properly, but this probably is not true. It is more likely that two thicknesses of inner tube have become pinched under the edge of the bead, resulting in a rupture of the tube at this point, permitting the air to escape with explosive force between the outside of the bead and the inner surface of the clinch, this explosion driving the bead entirely out of the rim at that point. The trouble is not that the envelope was off size, which is seldom the case, but with the careless way in which the tube was fitted. Explosions as described will sometimes occur even when a car is standing in a garage.

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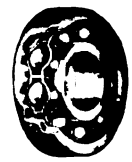
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It is a good plan to test the fitting of a tube before inflating it by turning the wheel slowly and looking for any projections or unevenness of the casing. If any are found, take hold of the casing with the left hand, the palm near the bead, pushing the outer side towards the car. Then with the thin edge of a spur lever lift the outer bead and push it slightly towards the center of the rim. If any of the inner tube is visible, the tube is not in the proper position. In this event, push the thin part of the lever under the bead and force the free end of the lever downward to release the bead at that point. Then let the bead settle back in position, making sure that the pinched tube has released itself. If the tube cannot be seen at that point, continue the examination all around the wheel. Be very careful in examining that portion of the bead fitted last.

Carefully following these instructions will give you a long-lived tube.

EXCESSIVE AMOUNT OF OIL.

(E. L. M., Boston, Mass.)

I have a new car which uses an excessive amount of oil. I used a gallon to every 150 miles at first, when the lift in the pump was taken up, but still use too much. I have gone over the oiling system, but can find no defects that are apparent. Can you suggest a means of overcoming this difficulty? I have driven a long time with other cars, but never had this trouble before.

Does the engine smoke much? If there is much leakage past the piston rings you would, of course, get a poor oil performance. Remove the spark plugs and see that the electrodes are not dirty or oily. Look for leaks at the rear crankshaft bearings and at the front and around the crankcase cover joints. You should get twice the oil mileage that you are getting now. Test the compression of the engine to see if it is weak. Make a systematic search for your trouble and it should reveal the cause.

HOW TO CLEAN CELLULOID WINDOWS.

(P. A. H., Bangor, Me.)

In the issue of the Journal of July 25, on page 37, under article, "Care of the Tops," I notice that it is advised that acetone varnish be used to renew the celluloid windows that have become scratched and blurred. I have tried to obtain some of the varnish here, but nobody knows anything about it. Will you kindly advise me where same may be obtained?

Acetone varnish may be purchased at most any paint supply house. If same is not obtainable in your locality, we suggest that the celluloid windows be wiped with a woolen rag wet with alcohol and ether mixed in equal proportions. This dissolves and removes a minute superficial layer and lays bare a new surface. To restore the polish, rub briskly with a woolen cloth and finish with silk or fine chamois. This will restore the windows to their original clearness.

WHAT IS A STONE BRUISE?

(F. G. J., St. Paul, Minn.)

I have often heard the term "stone bruise" spoken of in connection with an automobile tire and would like to know just what is meant by the term, what harm results from this cause.

A stone bruise is caused from the condition of the tire when it has become pinched between a stone and the rim, rupturing the fabric. This often occurs when the car is traveling at a high rate of speed with a partly deflated tire. A stone, stick or other hard object is struck by the wheel and the tire yields and pinches the fabric against the rim, but the fabric cannot stretch and so is torn in two to four places. There is no indication on the outside that any damage has been done, but sooner or later the tire blows out at that point. A practical demonstration may be obtained by the following method:

Take a piece of old tube and fold a thin cloth four or more times and place it inside the tube; put the whole on a solid surface (a hard board will do) and strike a heavy blow with the edge of a hammer against the tube. The tube will not be damaged, but the cloth will be torn where the blow was struck.

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Therefore, as soon as we have exhausted the materials on hand, we shall manufacture no more Paige Passenger Cars. We shall put our organization, our factories, every dollar of our large resources, every ounce of our energy on a one-hundred per cent. War Basis. We shall give our hands, our heads, our hearts to the Service of the Colors—until the War has been won.

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Paige service to Paige owners has always been and will continue to be the first obligation of our War-Time Policy. The Paige Cars in the hands of owners will be kept running. Our good name and the good will of our patrons will live. When the War is over and Peace has been won we shall resume the manufacture of Paige Cars.

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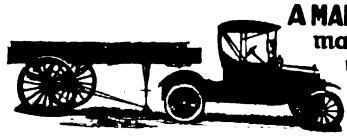
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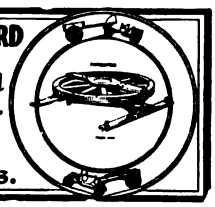
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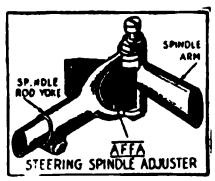
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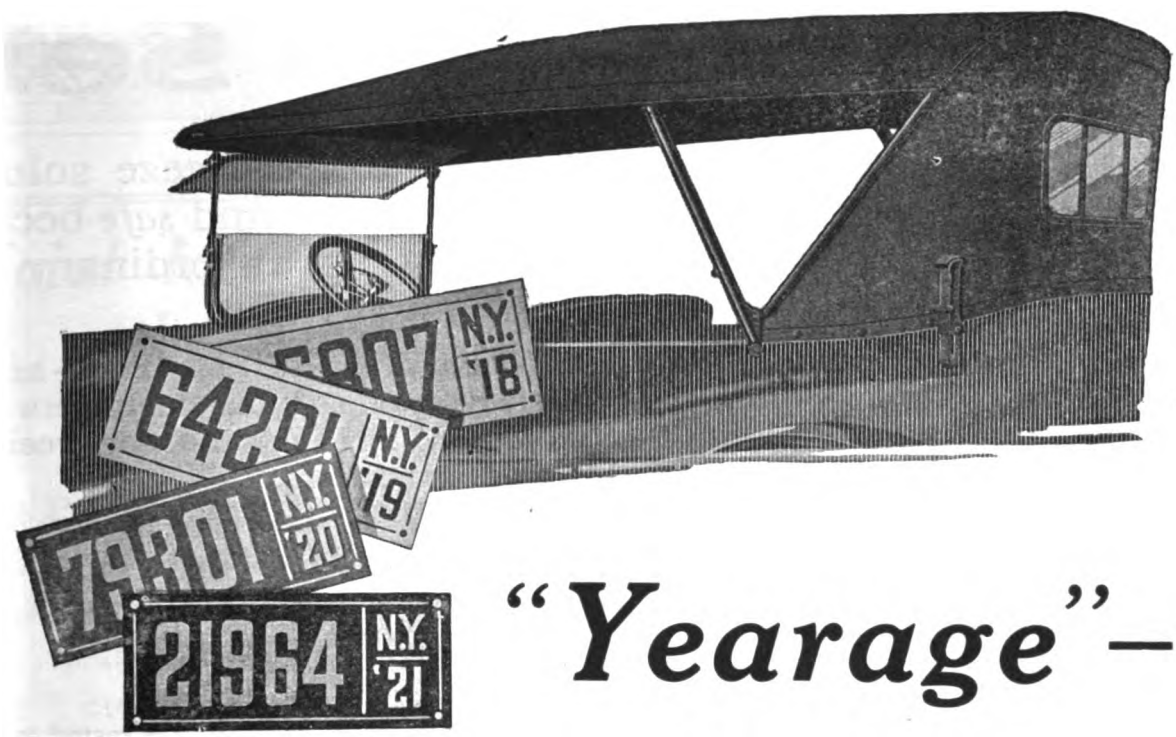
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with reasonable care will last as long as your car. In addition to being water, dirt, dust and grease proof—in addition to being washable—it maintains its flexibility permanently because it is made of materials that will not harden, oxidize or disintegrate under changing climatic conditions.

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That's a statement that will *sell* Mr. Motorist—and it's just what you can tell every one of your customers about Norwesco "TWELVE-TWENTY," the non-freeze *you can test.* It *prevents* frozen radiators.

There is no guesswork—no mixing—no dissolving—no mistakes with

NORWESCO TWELVE-TWENTY
PREVENTS FROZEN RADIATORS

The radiator is filled directly from the can—and is tested with an ordinary battery hydrometer—and easily kept at a strength that prevents *freezing* to 20° below zero.

Does not "find" leaks like so many of the ordinary anti-freezing solutions. No complaints about evaporation either—as it has a boiling point 12° higher than water.

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If you are already handling "TWELVE-TWENTY," send us your name and address and your jobber's name so we can forward all mail order inquiries to you. If you are not yet carrying "TWELVE-TWENTY," write today for our Dealer's Proposition. Be sure to name your jobber.

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THE AUTOMOBILE JOURNAL

VOL. LXVI. PAWTUCKET, R. I., OCTOBER, 1918. NO. 3.

Official Interpretation of Various Points in the Application of the Federal Motor Car Taxation

Where a Person Other Than the Manufacturer of the Chassis Completes and Sells An Automobile, the Tax Must Be Paid On the Complete Car, Less Any Tax Already Paid on the Sale of the Chassis—Where the Price of An Article Is Increased to Cover the War Tax, the Tax is Upon the Increased Amount—If the Dealer Adds Any Different Amount Than the Actual Tax Paid, the Tax Must Be Calculated Upon the Dealer's Total Bill.

OWING to the many different factors entering into the production of a complete automobile and the fact that there is no definite state of completion, considerable uncertainty existed as to how the new Federal taxes would apply. The fact that some trucks and some passenger cars might be delivered to dealers for sale to have bodies and other parts and equipment added to them later brought up another point of contention as to when and on what the tax would be levied, as also the point as to whether or not an advance in price made by a manufacturer to cover the tax would be included in the taxable value of the car.

Many Questions in Doubt.

These and many other questions regarding the Federal tax have been bothering dealers for some time and the National Automobile Dealers' Association, the largest organization of motor car dealers in the world, took up the matter to clear away the doubt that existed in the minds of so many of its members, particularly as to the application of the war tax as applied to truck chassis, extra bodies and other equipment.

In order to get an official construction on the matter, a letter was directed to the Treasury Department by the president of the N. A. D. A., and the following reply was received by B. C. Keith, deputy commissioner:

"Referring to your letter of Sept. 30, you are advised that automobile bodies, side cars for motorcycles, speedometers and other attachments and accessories to automobiles and motorcycles, are not taxable when sold separately, but they are when sold as part of an automobile or motorcycle or its equipment, whether standard or not.

Tax on the Complete Car.

"Also where a person other than the manufacturer of the chassis completes and sells an automobile, the tax must be paid on the complete car, less any tax already paid on the sale of the chassis.

"You are further advised that where a dealer, in order to reimburse himself for the tax paid by him to the manufacturer of the chassis, adds the exact amount of the tax to his invoice as a separate item, stating it to be the war tax, such amount may be excluded in determining the price for which the article is sold. But where the price of an article is increased to cover the war tax, the tax is upon the increased price. Or, if the dealer adds any different amount than the actual tax paid, no matter in what way or with what explanation, the tax must be calculated upon the dealer's total bill.

Status of Freight Bills.

"With regard to the inclusion of freight charges in the price upon which the tax is to be computed, you are informed that where the freight charges to a point of delivery are paid by the dealer, such freight charges, if billed as a separate item in the invoice to cover freight, need not be included in the amount upon which the tax is to be computed. However, as in the case of reimbursement of tax paid, if the price of the article is increased to cover freight charges, the tax is upon the increased price.

"Accordingly, where a dealer purchases a truck from the manufacturer for $1000, adds a body costing $400, and sells the complete car for $1900, plus $70 freight charges, plus $30 war tax, or $2000 in all, the tax is 3 per cent. of $2000, or $60, less the $30 tax already paid to the manufacturer upon the sale of the truck, making $30 tax. On the other hand, if the $70 freight charges and $30 war tax are billed as separate items, they need not be included in the amount upon which the tax is to be computed. The tax would then be three per cent. of $1900, or $57, less $30 tax already paid on the original truck, making $27 tax due upon the sale by the dealer of the completed machine."

Federal License Reduced.

In addition to the reduction in the taxes on motor cars and accessories, mentioned elsewhere in this issue, the Senate Finance Committee has also made a reduction in the Federal license as compared to the license tax as originally incorporated in the revenue bill by the Ways and Means Committee of the House of Reepresentatives. This reduction cuts in half the proposal of the House bill and fixes the rates as follows:

Automobiles and Motor Trucks.

Up to 23 horsepower	$5
23 horsepower and not over 30 horsepower	10
30 horsepower and not over 40 horsepower	20
Over 40 horsepower	25
Motorcycles	5
Electric vehicles, per horsepower	2

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Reports on Gasoline and Tire Situation Indicate Ample Supplies for All Useful Operations

Evidence of the manner in which the automobile industry is converting to war work was shown at the meeting of the National Automobile Chamber of Commerce held early this month, when the traffic committee's report showed car load shipments of automobiles for the month of September to have been only 11,700, as compared with 20,538 for the same month last year. One plant after another is converting to war work as rapidly as possible, some of them with 25 per cent. of capacity for the government, with others on a full 100 per cent. basis.

It was estimated at the meeting, at which Charles Clifton presided and which was attended by 103 manufacturers, that contracts for government work to an amount exceeding $800,000,000 have been taken by the automobile industry, resulting in a continued curtailment of passenger car production as the work of conversion is brought about. This includes the making of airplane motors, tanks, tractors, trucks, mine anchors, trailers, guns, rifles, revolvers, recoil mechanisms, steel helmets, ambulances, field gauges and scores of other articles for the war program.

Probably no other industry in the country of a similar size or importance has sacrificed so much of its product to supply the government needs in a big way as the automobile industry, which is the third largest manufacturing industry of the country.

At a meeting of the truck manufacturers in the afternoon the makers listened to reports of the gasoline and tire situation, which indicated ample future normal supplies for all useful motor car driving.

The makers are carrying on a campaign for conservation of all kinds of materials used in automobile factories, including repair parts, with the elimination of equipment of a character not absolutely essential.

The export committee meeting reported to the chamber its plans for exports of automobiles after victory is won. Exports of the automobile industry have exceeded $100,000,000 a year and countries throughout the world look to America to supply their needs for passenger and freight carrying vehicles. There were exports last year to 82 different countries, including 15 cars and one truck to Iceland.

At the truck meeting in the afternoon, with practically every important truck maker in the country in attendance, there was a general discussion of the government needs in trucks and the best measures for their prompt care. In addition there is an increasing demand for trucks for essential industries involved in war work directly and indirectly, which is placing a burden on the truck builders.

Victor L. Brown of the commercial vehicle committee, presided at the truck gathering, addresses being made by George H. Pride of the highways transport committee of the Council of National Defense on the work of that committee and the need for better roads, particularly for military uses.

George M. Graham spoke on "How the Motor Truck Industry Is Affected by Developments in Washington."

Other addresses included S. A. Miles on "Rural Motor Express;" H. G. Shirley on "Need for Uniform State Laws Governing the Use of Motor Trucks," and S. M. Williams, president of the Highway Industries Association, on "The Work of That Organization in Highway Matters."

The makers discussed in detail the suggested standardization of solid tires on motor trucks, wherein there will be eliminated a large number of the odd sizes that require the carrying of excessive stocks by dealers, bringing the number of sizes down to a comparatively small number, as was done in the pneumatic tires standardization plan, which resulted in the standardization of seven rims and nine sizes of tires, eliminating more than 200 odd sizes.

C. C. Hanch, chief of the Automotive Products Section of the War Industries Board, attended the meeting to tell the members of the requirements of that division and the new priority rulings under which passenger car manufacturers are permitted to balance their inventories under a curtailment of 50 per cent. from the 1917 production, to be accomplished by Jan. 1, while the truck manufacturers' production to be sold only to essential industries, is limited to one-third of their average production for the 18 months ending July 1, 1918.

Ban On Sunday Use of Gasoline Is Lifted

If Stocks Again Fall Dangerously Low Request for Conservation Will Be Renewed.

Fuel Administrator Garfield has lifted the ban on the use of gasoline on Sundays, but states that should the gasoline stocks again fall dangerously low the request for conservation will be renewed. It is also announced that priorities will probably be given for shipment of gasoline overseas, which means that the war demands will be met from stocks ahead of the domestic demand.

The fuel administration in announcing the withdrawal of the request that motorists cease using their cars for any purposes except urgent business on Sundays, stated that as a result of the public's loyal response to the wishes of the government, 1,000,000 barrels of gasoline had been saved for military purposes.

The peak load of domestic consumption is passing, in the belief of the oil division of the fuel administration, and it is hoped that overseas shipments will not be quite so heavy. Through a priority order giving preference at refineries to shipments for overseas prompt supplies for Europe will be assured, and if any shortage exists it will be domestic.

The stocks of gasoline east of California, it is stated, have not materially increased or decreased. On Oct. 14 the stocks were 3,134,731 barrels of motor gasoline and 166,369 barrels of aviation gasoline. This represents the entire reserve and is not available for export, as it is stored in territory as far west as Wyoming and includes storage in various interior oil producing localities.

RED CROSS NEEDS 1050 MORE MEN FOR OVERSEAS DUTY.

Major H. P. Harding, Commander of Camp Scott, Chicago, the official training camp for Red Cross drivers, states that due to increased facilities at the barracks they will enlist 1050 more men for duties overseas in France and Italy.

This section is open to men under 18 years or over 45 years of age, also to men in deferred classifications. It is necessary that the applicant have at least one year's driving experience.

A course of training lasting four weeks is given, consisting of mechanical training and military discipline. The training is intensive. Military discipline is upheld always. Actual work in constructing and reassembling automobiles is given. Demonstrations of all possible accidents and break downs are shown with the quickest method of repairing.

A driving course, which has as rough as the roughest spots in No Man's Land, adjoins the barracks, and the driver is required to cover this course under all conditions, at certain speeds and with certain loads.

Forty dollars a month and maintenance, including equipment, is paid after sailing; while in training, half pay and maintenance.

Recruiting headquarters of the Automotive and Mechanical Sections, 528 People's Gas Building, Chicago, Ill.

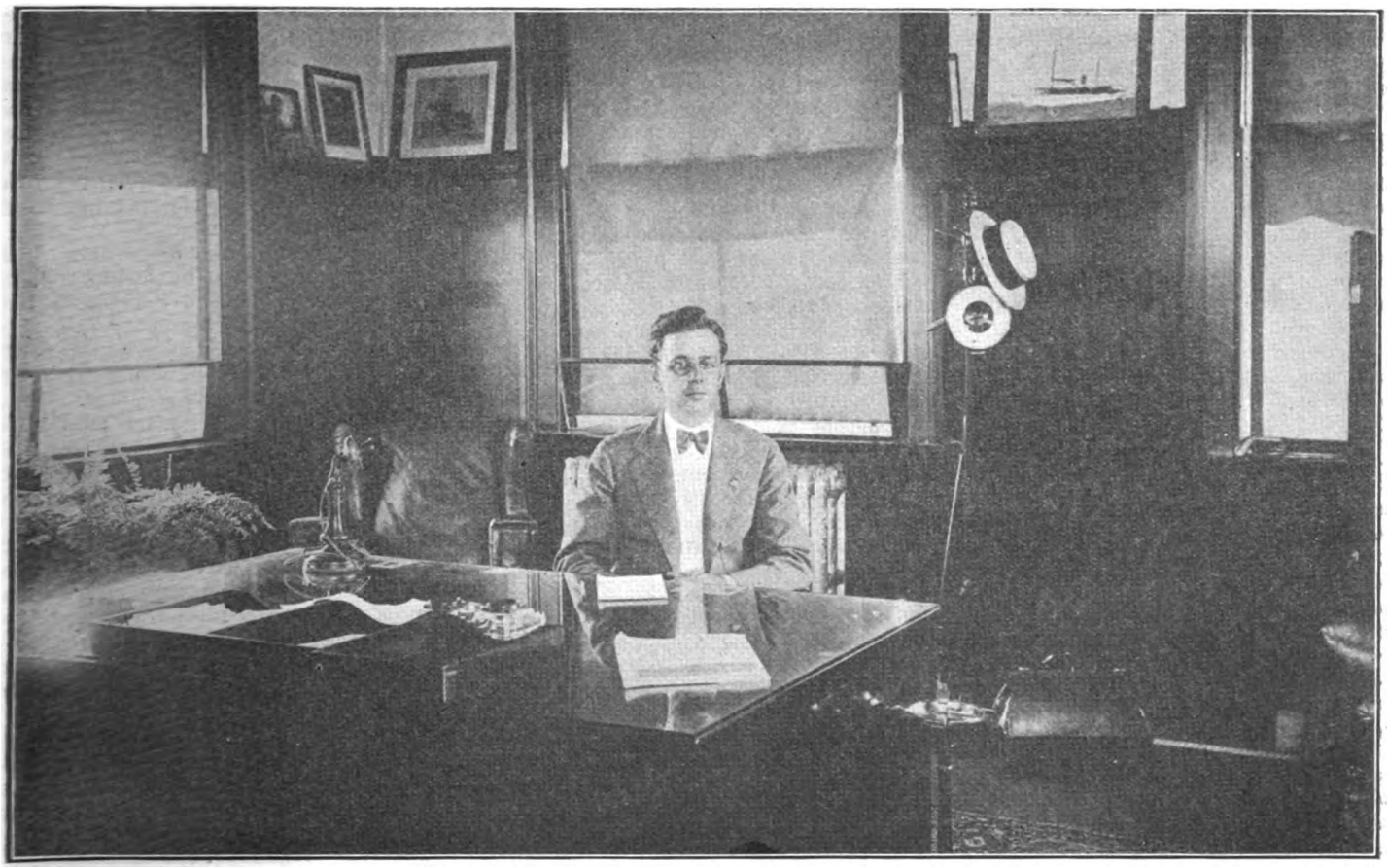
MITCHELL & SMITH CO. CARRY BIG LINE OF GASKETS.

The Mitchell & Smith Co., Inc., 1090-92 Commonwealth Ave., Boston, Mass., are carrying a large stock of gaskets for every make of car and can fill all orders without any delay.

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Dutee Wilcox Flint the Oldest Ford Car Dealer in Point of Service

Has the Largest Organization For Distributing Automobiles, Trucks and Tractors In New England—Maintains Completely Equipped Service Station in Providence and Twenty Branch Stores in Rhode Island and Connecticut—Is New England Distributor of Fordson Tractors and Head of Oil Company Selling More Than 3,000,000 Gallons of Gasoline Annually.



Dutee Wilcox Flint in His Private Office.

"WIN the war and win it fast. Fitting one's convenience to his regular business in order to avoid a patriotic, moral duty is of secondary consideration as compared with winning the war." These pithy statements make up the war slogan of Dutee Wilcox Flint of Providence, R. I., the oldest Ford dealer in point of service and the largest individual distributor of Ford cars.

The writer had camped on the trail of this extremely busy dealer for almost a week in an endeavor to find a suitable opportunity for an interview and thus be able to gain an impression of the personality of the man who has built up one of the largest motor car distributing and service organizations in America. While superintending the work of photographing his large service station on Allens avenue, Providence, I saw him daily enter into and go out of his private office. Great pressure of business affairs was impelling him toward some definite goal, and no one could have possibly diverted his attention for even a minute from the daily schedule of work he had set out to accomplish. He certainly seemed elusive—not designedly so, but as a necessity, as he is not prone to show even the attitude of evasion. He is fearless, full of initiative, and would always be a leader of men in any line of activity. At last my determination and patience to see the chief was rewarded. He appeared to have forgotten the regular rest period, as he was still forging ahead when others had stopped for lunch. His courteous general manager, Benjamin Peckham, saw that the "coast was clear," and projected me into the vortex of this busy man's affairs, and his relaxation of regular effort was short, for he could allow me only a few minutes of his time, but made special arrangements to give me an hour the next day. At the interview he instantly impressed me as 100 per cent. American, 100 per cent. as a motor car dealer and a creator of efficient motor car service, 100 per cent. all around business man and cheerfully good fellow.

Supplementing the war slogan quoted

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above, Mr. Flint continued with the following short, snappy declarations delivered like the action of a rapid fire machine gun:

"The sooner dealers realize that the most important business before them is to do everything they can to help win the war, just so much sooner will it be satisfactorily finished and the automobile business will be back into its normal condition. I am bending all my energy and resources toward conservation and contributing to the sinews of war, and am sacrificing and adjusting my business as best I can to overcome the disintegration of my former efficient organization, in order to release manpower for the war. This may naturally reduce the productiveness of my service station, but, fortunately, at this time, only in so far as the broader distribution of passenger cars is concerned.

"It will not help dealers or those engaged in other lines of business to complain of the unsettled conditions brought on by the war. It is up to all of us to pull off our coats, roll up our sleeves and pitch in with an earnest good will to apply our energies wherever they will do the most good toward winning the war. When you have an obnoxious job on your hands, the more quickly you clean it up, just so soon will the atmosphere of discontent and uncertainty be clarified. We must work hard and fast to remove the hated barrier to civilization, peace, contentment and legitimate business—and our whole duty now is to help win the war."

A Pioneer Ford Dealer.

The Ford agency of Dutee Wilcox Flint was organized in the fall of 1904, when Henry Ford was building and marketing a two-cylinder car. Then production and sales were limited to the minimum. If a dealer sold 50 cars a year he was indeed considered prosperous, and Mr. Flint did not average that number of sales annually. Then people had to be educated to the utility of a car and how to carefully operate one. As a pioneer, Mr. Flint had his full share of this promotion and sales work. He is now 35 years of age and was only 21 when he embarked upon the tempestuous sea of the early days of a motor-car agency.

Mr. Flint was persistent and held steadfastly to his Ford agency, backed up with all the ardor and optimism of youth. It can be said of Mr. Flint that he always had implicit faith in the genius and ability of the man out in Detroit who was destined to become the big man of the industry. He knew in advance of the great manufacturer's plans to build a light-weight car that would be easy and economical on tires as well as economical in fuel and oil consumption, with minimum mechanical upkeep expense. His faith in Mr. Ford's promise to produce the "Universal" car was not misplaced, as his rapid and wonderful success as a Ford distributor has proven.

In the winter of 1905 Mr. Ford brought out his model K six-cylinder car, and Mr. Flint sold 20 of this model in 1906 and 23 in 1907. In the fall of 1906 Mr. Ford produced his first model of the light-weight, medium-length wheelbase Ford, then designated as the model N. The touring car sold for $950 and the roadster for $900, f. o. b. Detroit, and it was then considered the "best buy" at anywhere near its price. During the season of 1907 Mr. Flint sold 300 of the model N. Each succeeding year his sales were increased by leaps and bounds, and the sales for the most prosperous year, just preceding the entry of the United States into the war, exceeded 10,000 passenger and commercial cars.

Territory Controlled Has 1,250,000 Population.

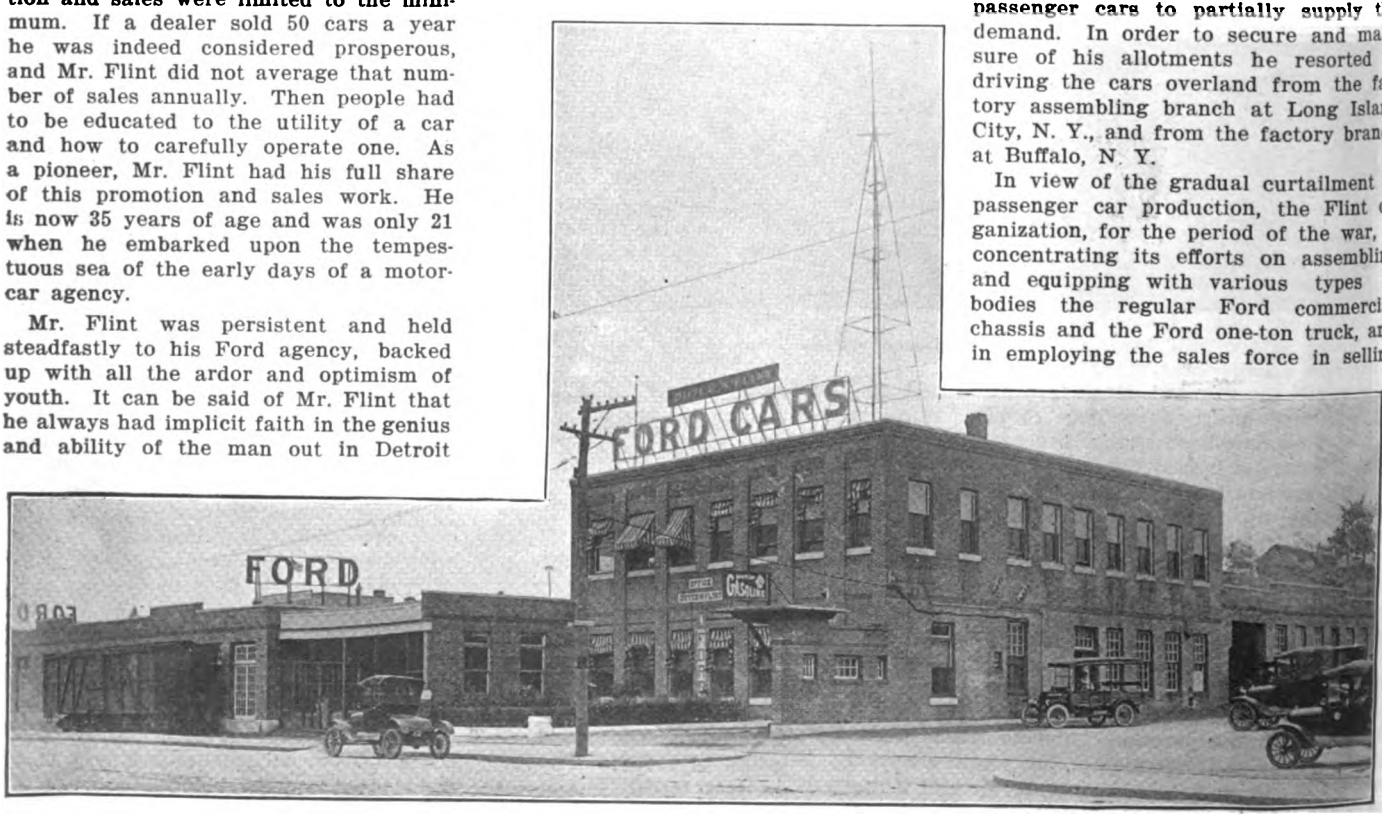
Dutee Wilcox Flint controls, as his selling territory, the State of Rhode Island and Fairfield and New Haven counties in Connecticut. He operates 20 stores in this territory, with service stations in all of them. Aside from the main assembling plant, service station and general offices located on Allens avenue in South Providence, the location of his sales stores in Rhode Island are: Main salesroom, 172 Washington street, Providence; Pawtucket, Newport, Westerly, Woonsocket, Arctic, Wakefield, Warren and Bristol. Salesrooms in Connecticut are located at Bridgeport, New Haven, Waterbury, Stamford, Greenwich, Meriden, Danbury, South Norwalk, Wallingford and Derby. This territory has at least 1,250,000 population and it is one of the richest manufacturing sections in America, with thousands of miles of good roads to encourage the extensive use of motor vehicles for business and pleasure.

In connection with the 20 stores, a line of standardized accessories and supplies is carried in each, for the convenience of Ford owners, and only such accessories are carried in stock which are strictly applicable to the Ford car. Distributed among the 20 stores are spare parts valued at between $150,000 and $200,000. At the service station in Providence $40,000 worth of spare parts are carried as standard stock and at the Bridgeport, Conn., service station a like amount of spare parts are carried. Between 500 and 600 bodies, mostly for commercial cars, are a part of the regular stock supply. In fact, the service plant in Providence is operated on the basis of a factory, so complete is the equipment and production facilities, and a number of cars could be built from the spare parts and bodies on hand, if occasion should demand.

Concentrating on Service Work and Commercial Cars.

Due to the Ford Motor Company's reduction of its production of passenger cars to meet the Government's policy of conservation, as well as the difficulty of securing shipment by railroad, Mr. Flint's allotment of passenger cars has been limited for the past several months, as compared with his former average of 1000 cars per month. Mr. Flint, like many other dealers, had strenuous work to do to secure even a small number of passenger cars to partially supply the demand. In order to secure and make sure of his allotments he resorted to driving the cars overland from the factory assembling branch at Long Island City, N. Y., and from the factory branch at Buffalo, N. Y.

In view of the gradual curtailment of passenger car production, the Flint organization, for the period of the war, is concentrating its efforts on assembling and equipping with various types of bodies the regular Ford commercial chassis and the Ford one-ton truck, and in employing the sales force in selling



The Dutee Wilcox Flint Ford Service Station on Allens Ave., South Providence.

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them. This is a branch of the business on which attention can be centered during the war, as the commercial car and truck have not come under the ban of the Government as non-essential. Concentration along the lines of conservation particularly includes service work for the thousands of Ford owners in Mr. Flint's territory. Although the capacity of the Flint service station is not being used as extensively as it was before the passenger car curtailment, he is enabled gradually to regulate the volume of service work according to the number of men available. At present 50 people are employed in the general offices and mechanical departments at the Providence station and 150 people are engaged in the main store in Providence and in the other branch stores and service stations. Before the curtailment of passenger car production 375 people were employed in all branches of the organization. Many of them were road men, and that loss is not felt owing to the greatly reduced supply of new cars.

Mr. Flint does a considerable business in used Ford cars, taking them in only on the established trade basis. All used Fords are put into first-class running order, the cost of such work having been predetermined by his appraisers and the charge is included in the prices at which the machines are sold.

The Providence Service Station.

The Flint service station is located within several hundred feet of the Providence river, on Allens avenue, and has a frontage of 160 feet and a depth of 170 feet. A railroad siding at the front of the building affords excellent shipping facilities for all freight. In normal times Ford car units were received at the railroad siding, direct from the Ford Motor Company's branches, and unloaded at the door of the assembling department.

Until recently the majority of the cars distributed by the Flint organization were received at the service stations in Providence and Connecticut points in units and then assembled into complete cars. Under such conditions these service stations were extremely busy.

The modern service station building is of brick and cement fireproof construction throughout. The front has two stories, with general offices on the second floor and the main entrance is on the ground floor at the side. Upon entering the station one directly faces the parts and supply department, which is enclosed, with serving counter at the front. Here thoroughly trained and courteous clerks promptly serve customers. All parts, supplies and accessories are sold for cash. There is a cashier's office at the end of the counter, where all cash is received and transactions accounted for.

In front of the building on the ground floor is a large office occupied by the accounting department, presided over by Julius G. Ford, assisted by a competent force of young ladies. This office is furnished with all the modern accounting equipment. The system of accounting is free from unnecessary complication, due to all business being transacted on a cash basis.

The other departments in the one-story section of the building are: New car stock department, Fordson tractor department, office of the superintendent and service manager, car assembling department, machine shop and repair department, paint shop and garage for the gasoline delivery trucks.

On the second floor are the general executive offices of the directing staff, presided over by the general manager, Benjamin Peckham, and the assistant manager, J. F. Peckham, Jr., who are systematic and thoroughly trained business men of broad caliber. Here also is located the private office of Dutee Wilcox Flint, and adjoining it is the office of his private secretary, Miss McTernan, who has held that position for twelve years. It is said of Miss McTernan that she is all business, with frills and foibles eliminated. It might be stated here that during the busiest periods all correspondence is dictated on the Dictaphone. The executive offices are handsomely furnished in mahogany, with all the most modern office appliances and equipment, and are separated by heavy plate glass and entirely enclosed.

The wireless tower on the roof of the service station was formerly used to carry messages back and forth between the service station and Mr. Flint's steam yacht when he and his general manager, Mr. Peckham, were off on recreation trips. This wireless station was disconnected shortly after the United States entered the war and Mr. Flint's yacht was turned over to the Government.

At the side of the building on the second floor are located the executive and business offices of the Dutee W. Flint Gasoline Co., Inc., and the office of Harvey Flint, manager of the Fordson tractor department, who is a brother of the head of the organization. He was especially selected for this department because he has specialized in agriculture. The Dutee W. Flint Gasoline



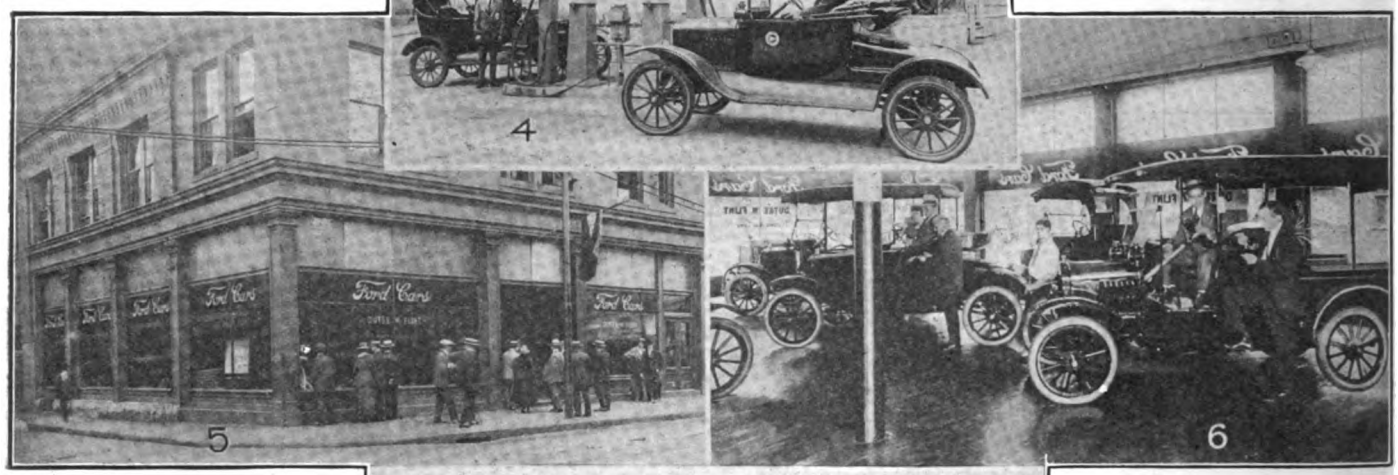
1—Office of the General Manager, Benjamin Peckham, Who Actively Directs the Staff and Carries Out Mr. Flint's Policies. 2—Accounting Department, Where the Finances Are Carefully Looked After by a Corps of Efficient Accountants. 3—In Foreground, Tractor Department Manager's Office, and Beyond, the General Offices of the Dutee W. Flint Gasoline Co., Inc., with the Manager, Alexander R. Fritz, at the Extreme Right.

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Co., Inc., although a separate organization from the Ford distributing agency, is more or less allied with the interests of the Ford agency, due to the fact that Mr. Flint felt, from its inception, that he required an efficient and systematic gasoline and oil distributing department to serve his 20 stores and service stations. This department is managed by Alexander R. Fritz, who is well known as an oil specialist.

The machine shop is fully equipped with modern machinery, including lathes, drill presses, acetylene welding outfit and many special tools and other machinery, a general list of which is given below and which will be of exceptional interest to those who seek to conserve in time and labor:







4—The Largest and Handsomest Gasoline Filling Station of the Dutee W. Flint Gasoline Co., Inc., Located at Broad and Myrtle Sts., Providence, R. I. 5—The Main and Largest Store, Located at 172 Washington St., Providence. 6—A Section of the Sales Room of the Providence Store. 7—The Large Gasoline Storage Tanks Adjoining the Service Station, with Several of the Delivery Trucks in Foreground.

Connecting rod aligning block.

Piston holder for placing rings and tightening rods to wrist pins.

Triple gear block to hold gears while reaming.

Piston block to hold for reaming wrist pin bushings.

Main bearing cap oil-way cutter.

Cylinder block holder to fit crank shaft.

Cylinder block holder to fit rods and grind valves.

Electric dynamo and engine frame for running in engine, testing for oil leaks, compression, magneto output and to loosen overhauled engine before placing in case.

Transmission and engine case horse to hold these units while cylinder and transmission are on the bench.

Rear end testing motor to loosen gears and test for noise.

Reboring mill for reboring cylinder block to oversize.

Brazing outfit for welding crankcase arms and all other broken parts.

Rear end bench for holding rear end while in the process of being O K'd.

Rear end horses to hold up rear of car while the assembly is on the bench.

Chain hoist traveling on an overhead track, to lift engine from chassis and carry to motor bench and testing motor.

The chain hoist is also used to carry dirty engines to a vat of chemical solution, where they are immersed and cleaned of all grease, thus giving the mechanics a clean unit on which to work.

Specialized Tool Equipment.

The repair department is equipped with a large number of high-speed wrenches and other time and labor-saving tools (see Figs. 1 and 2). The equipment makes clear the extent of specialization carried out in this station and how all lost motion and wasted time are done away with. Most of these tools were specially designed by the Ford Motor Company to fit the particular requirements of overhauling work on the Ford chassis. The rear-end jack shown in illustration (Fig. 1) was designed and built by Joseph Lewis, popularly known in the service station as the high-speed specialist.

All tools and small mechanical equipment are kept in systematic order in a special tool room and are issued to the employees on requisitions made out and signed by the foreman of the shop. When mechanics have finished using the tools they must be returned, and the habit of losing tools in this station has been almost entirely eliminated.

The Flint service station is operated on the basis of standardized operations and a flat rate of charge is made on each operation of overhaul or adjustment. By this system they have been enabled to set a uniform and consistent schedule of prices for all work and know in advance just what any operation of overhaul will cost. On this basis the customer can accept or reject it, and if acceptable he knows when he calls for his car what the charge will be. The basic cost of labor on each operation was predetermined by repeated practise on numerous operations, so that it was a simple problem to set a schedule of charges that are fair to all. These charges, however, are for labor only, and all parts and materials used on the jobs are charged for extra.

When a customer delivers his car to the service station for any overhaul or adjustment that he may deem necessary, regardless of what he has determined the car needs, the service manager delegates an expert tester to drive the car and determine whether there is anything else that requires attention. If he finds other mechanical defects, he makes a report on the same to the service manager, who, in turn, makes the facts known to the owner. Then it is for the owner to judge as to whether he should include them in his order for work to be done.

The details of the customer's order are placed on a shop order blank, specifying the parts and supplies to be used. Before starting on the job the shop foreman fills in a requisition blank as an order on the parts department for all necessary parts and supplies for the job, and the same are charged to the job. Every mechanic working on an operation is given a time ticket containing the shop order number, the particular operation specified, the mechan-

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ic's name, number and rate per hour he receives, with columns for number of hours, amount and account number. The shop order is in triplicate, first sheet of white bond, second sheet of cream bond and third sheet of Manila cardboard, size 11x8½ inches. This heading is carried on the triplicate sheets of the shop order: "Shop Order. Description of car, owner's name and address, work authorized by, shipping instructions, shop order number, date of order, date wanted." Then follow the head "Instructions," and a number of blank lines for details or order and blank lines, "Signed, Inspector," "Approved, for owner." The following clause is on the original order signed by the owner: "I agree to pay for the above work in cash when ready and understand that prices quoted are for labor only, parts extra."

At the bottom of the original order is this clause printed in red: "Customer Note: All repair work is strictly cash. Estimates are for labor only, parts additional. Customers' cars operated by our staff at owner's risk. Not responsible in case of loss by fire or theft. We are not responsible for loss of tools, switch keys or other articles left in cars." The second sheet is for the shop clerk and has the same heading as the original order, excepting at the bottom of the sheet is this: "Note: When job is completed and cost is computed, shop clerk will promptly return this order to office." On the back of the second sheet of the shop order, which goes to the shop clerk, is a form in which is carried a description of the parts and supplies used, cost and selling price and the time and cost of labor required on the job. These details are recorded on this cost sheet by the shop clerk and then it is turned into the billing department, and from the charges thereon the customer's bill is made out. The third sheet of the shop order is held by the shop foreman until the job is completed, when it is turned over to the shop clerk.

KEY TO THE HIGH-SPEED WRENCHES AND TOOLS AND THE OPERATIONS THEY PERFORM.

A—Clamp to put on rear springs.
1—Ratch screw driver for putting in screws on windshields and fitting up tops.
2—Gear puller for low-speed gear.
3—Bending bar for adjusting speeds.
4-5-6-7—Speed wrenches for putting on running boards.
8—Speed wrench for putting on fenders.
9-10—Speed wrench for body bolts.
11-12—⅝-inch speed wrench to line transmission.
13-14—Speed wrenches for taking off cones on front wheel.
15—Speed wrench to fit into sockets in set 23.
16—Speed wrench to put on the hub bolts.
17—L wrench to put on steering post.
18-19—¾-inch T wrench to take out magneto coil.
20—Disc drum puller.
21-22—Valve reseaters.
23—Mossberg socket end wrench set.
24—Flywheel wrench.
25—Wrist pin wrench.
26-27—¾-inch speed wrench for taking off engine stud bolts.
28—Speed wrench to tighten fenders.
29—Speed wrench to take off radiator.
30—Speed wrench to take off cylinder head.
31—Speed wrench for different sockets.
32—Valve grinder.
33—Speed wrench to put on brackets for rear fender.
34—Speed wrench to put on top rests.
35—Speed wrench to put on brackets for rear fender.
36—Speed wrench to put on differential driving gear.
37—Speed wrench to put on dash bolts.
38-39—Speed wrench to put on rear wheels.
40—Speed wrench to put on rear spring perches.
41—Speed wrench to put on brake shoes.
42—Tool to straighten front axle.
43—Gauge to line up front wheels.
44—Tool to straighten front fender brackets.
45—Bolt cutter.
46—Gauge to measure distance between headlights.
47—Tools to put on head and sidelights.
48—Electric drill.
49—Jack to place under differential housing and raise rear end.

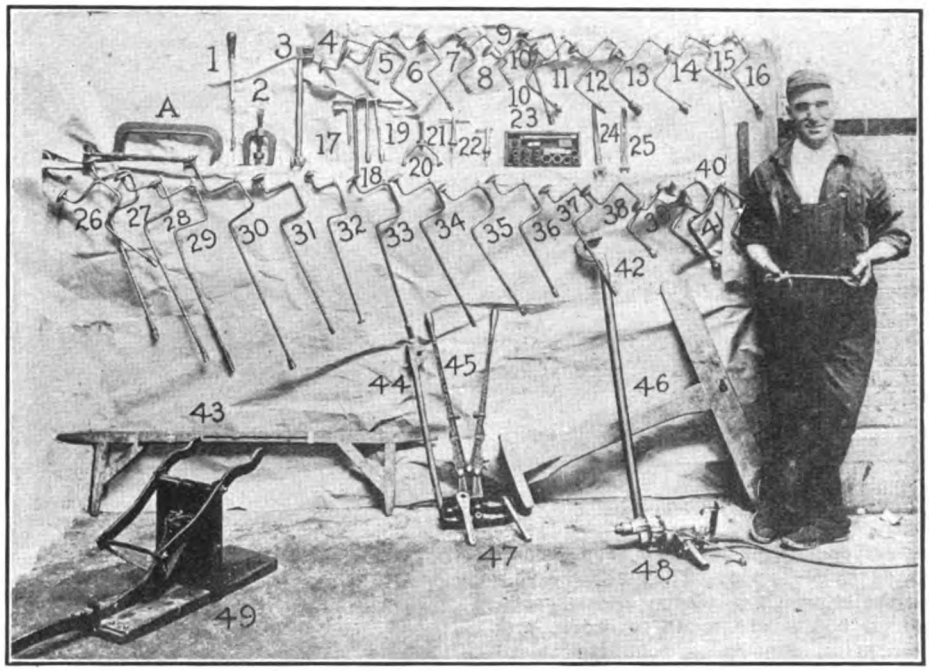


Fig. 1—High-Speed Wrenches and Other Tools Used for General Overhauling and for Building Up a Ford Car Complete. Joseph Lewis, Popularly Known in the Service Station as the High-Speed Specialist, Is at the Extreme Right, Holding a Main Bearing Scraper.

Metal Department and Body Shop.

In connection with the repair department there is a first-class radiator repair department, where all kinds of radiator repairs are made by experts, and a sheet metal department that is equipped with a cornice brake and metal folding machines, and here fenders and mud guards are repaired and the facilities

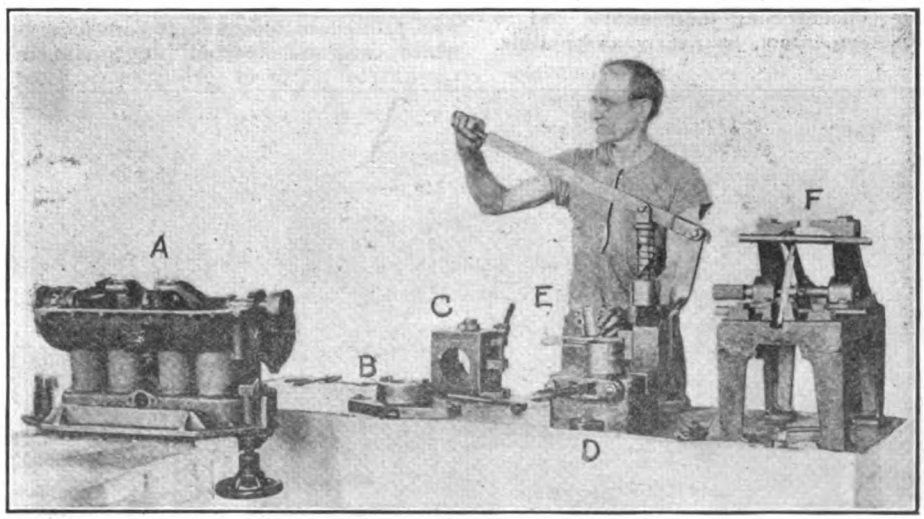
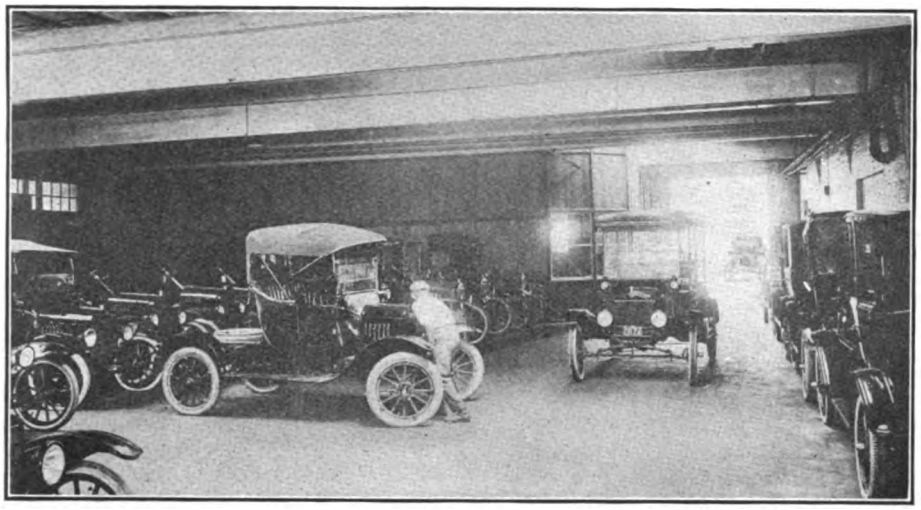


Fig. 2—Form Machines for Holding Pieces of Work. A—Cylinder Block Holder for Scraping in Main Bearings. B—Triple Gear Holder for Reaming. C—Piston Holder for Reaming Wrist Pin Bushings. D—Piston Holder for Fitting Rings to Pistons and Rods to Wrist Pins. E—Main Bearing Cap Oil Groove Cutter. F—Connecting Rod Straightening Machine.

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New Car Stock Department, Where New Cars Are Held Until Delivered to Owners and Branch Stores.

are sufficient to make new fenders and guards if necessary. They also have a body-building shop where special commercial bodies are made to order; and their paint shop is as complete as all other departments. All special iron work is done in the service station. In fact, their facilities and organization of specialists are so complete that one would imagine himself in a regular motor car factory. There has been nothing overlooked or omitted that would afford the most satisfactory service, and the perfect, simple system under which it is operated has greatly reduced the cost of service to Ford owners in the territory served by the Dutee W. Flint distributing agency.

Mr. Flint has instilled into his organization a perfect order of cleanliness and neatness. At quitting time all nooks and corners of all departments must be thoroughly clean of all waste, oil and water. The same order of neatness is maintained in all the offices of the staff —no desks littered with papers, as there is a file for every important paper.

A considerable number of the Flint organization entered the service of their country. In order to instill into those remaining the necessity of more than ever concentrating their efforts and to help keep intact, as nearly as possible, the efficiency of the original organization, the following persuasive appeal was printed in blue and red on a large white card and posted in prominent places in the service stations and stores and the men showed a spirited response:

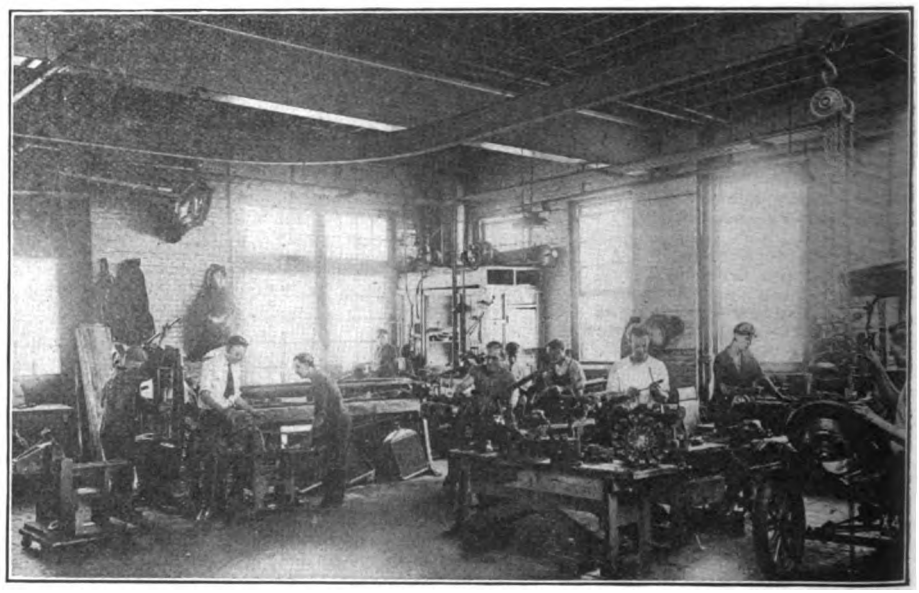


WAR AND SERVICE

LABOR IS SCARCE. OUR MEN ARE BEING CALLED TO SERVE THEIR COUNTRY. WE SHALL NOT REPLACE THOSE WHO LEAVE, BUT SHALL ASK THOSE WHO ARE LEFT TO WORK HARDER AND SO DO THEIR SHARE.

WILL YOU BE CONSIDERATE? IT IS ONE WAY YOU CAN HELP.

DUTEE WILCOX FLINT.



A Section of Repair Department Where Units of the Car Are Overhauled. Note the Chain Hoist in the Foreground on the Right, Holding an Engine Just Lifted from a Chassis. This Chain Hoist Travels on an Overhead Track That Encircles the Entire Shop and Heavy Units Can Be Lifted and Carried to a Number of Locations.



Parts and Supplies Department in Service Station.

New England Distributor of Fordson Tractor.

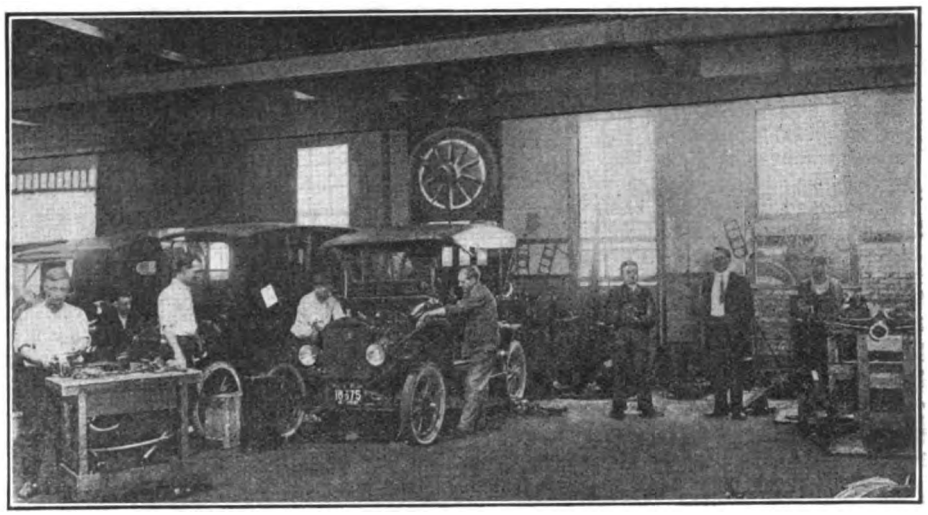
Dutee Wilcox Flint is the New England distributor of the Fordson tractor manufactured by Henry Ford & Son. Harvey Flint is the manager of the tractor department. During the past several months the tractor and its working units, a No. 7 Oliver plow and a disc harrow, have been transported on a five-ton Pierce-Arrow motor truck over sections of New England. This truck is provided with skids for unloading the outfit and it is manned by several experienced operators to handle the demonstration work.

Demonstrations of the tractor have been given to large numbers of farmers and prospective dealers. Mr. Flint, in carrying out the initial policy of Henry Ford & Son, in introducing the tractor during the summer has been contributing this great tractor educational work at his own expense and selling the trac-

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tors to farmers at the cost price, $750. He is distributing 500 tractors at actual cost in order to encourage the immediate use of Fordson tractors to greatly aid in increasing farm production and materially help to conserve and increase the resources of New England.

On Aug. 12th the motor truck, loaded with the tractor outfit, was started on an educational and dealership campaign. The schedule of this trip covered 35 counties, with an approximate distance of 2600 miles to be covered. The Flint tractor distributing agency will carry a complete stock of tractor repair parts and maintain an unexcelled mechanical service at its service stations in Providence and Connecticut. Other tractor service stations will be established with the largest and most centrally located sub-agents.

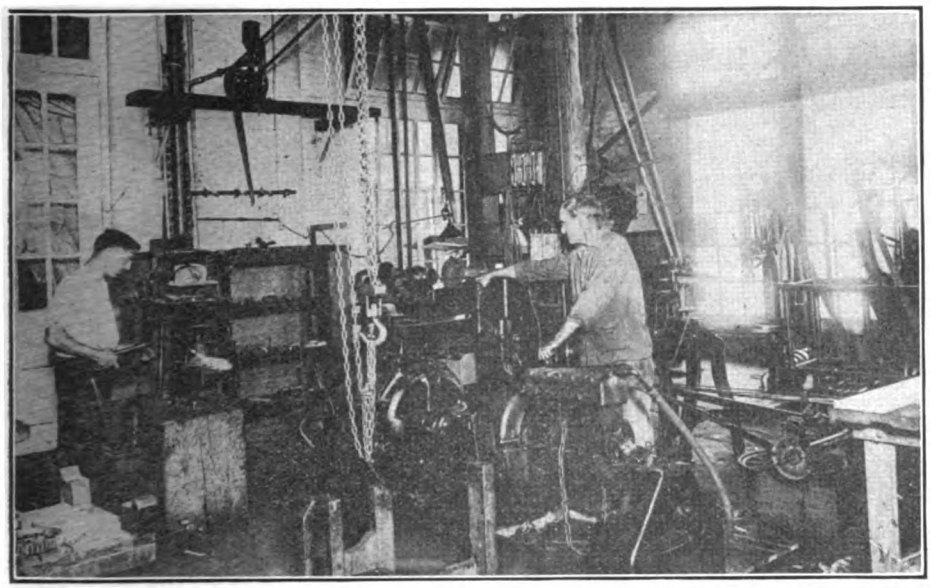


A Section of Repair Department, Showing Mechanics Working on Chassis.

3,000,000 Gallons of Gasoline Sold Yearly.

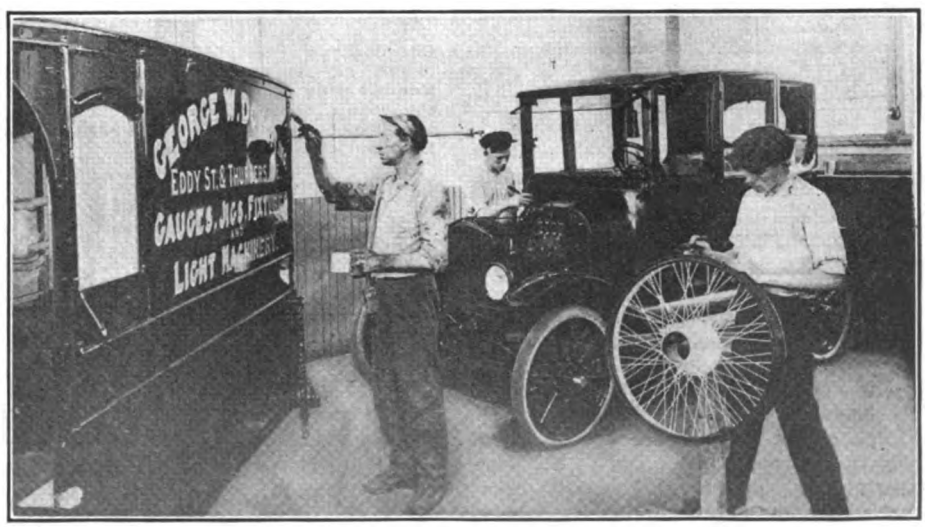
The Dutee W. Flint Gasoline Co., Inc., is a separate company from the Dutee Wilcox Flint motor and tractor distributing agency. The gasoline business organization and distributing facilities have been developed gradually during the past five years. It was started in a small way only to serve the numerous Flint branches. Its growth was natural and the expansion of the service was rapid, made so through the efficiency of serving not only the retail trade, but numerous motor car agencies and large operators of trucks. Alexander R. Fritz, an expert oil man, is the manager of this department. The company also specializes in the very best grades of lubricating oil.

The gasoline company operates eleven gasoline filling and lubricating oil stations in Providence and vicinity. Their pumps are driven by electric motors, the supply of gasoline being pumped from the large storage tanks into reserve tanks and from these tanks cars are filled by gravity. The large two-cylinder pump shown in the illustration of their latest and handsomest filling station at Broad and Myrtle streets, Providence, was designed and built in the Flint service station. The company's sales of gasoline average more than 200,000 gallons a month, or approximately 3,000,000 gallons annually. In order to transport this large quantity of fuel to their service stations and large gasoline users the following motor tank trucks are continually operated: Four Pierce-Arrow tank trucks of 1650, 1460, 728 and 720 gallons capacity, respectively, and one Ford tank truck of 345 gallons capacity.



Machine Shop, Showing Engine Installed in Testing Stand and Connected with Electric Testing Motor.

The railroad siding in front of the service station extends alongside the large gasoline storage tanks that are located in a brick-walled and concrete pit adjoining the service station, affording convenience in running off gasoline from oil tank cars into the storage tanks. The company also receives gasoline from boats at the State pier, located several hundred feet from the gasoline storage station. In the pit are four large tanks, each holding 25,000 gallons, and six tanks, each holding 10,000 gallons, making a total storage capacity of 160,000 gallons; and underneath the floor of the service station are three tanks holding about 22,800 gallons more. The development of the gasoline business by Mr. Flint would make an extremely interesting chapter in the business life of any man, but now that the battle has been won and Flint's gasoline is acknowledged to be in keeping with his standard of quality, he is satisfied to sell that product, and others can do the worrying if they wish.



Paint Shop, Where All Fine Jobs of Painting and Lettering Are Executed.

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Sales Forms Used.

The sales department uses a simple set of blank forms in sales transactions. In the sales memorandum of order (Fig. 4) you will note the blank section for properly filling in if the order is a time-payment deal, as Mr. Flint sells cars on the deferred payment plan, and his transactions on this basis have been quite satisfactory. Another form is the "Shop Tag and Delivery Check" (Fig. 5), which is explanatory.

Driving lessons are given to new owners by a corps of specially trained instructors, a reasonable number being given to each purchaser.

A Modern Merchandizer.

Dutee Wilcox Flint sets the pace for his selling organization. He is, first of all, a real salesman. He has deviated from the beaten path of worn-out, old methods of selling. His advertising carries the keynote of his own sales talk. It is real human-interest copy. Even the lowest priced car in the world requires selling ability, for the great majority of Ford cars are sold to those in medium circumstances. To anyone the expenditure of $500 or more must be given serious consideration; then, too, they must be convinced of the reasonable operating and upkeep expense. The Flint organization is fortified with convincing, honest facts applicable to their line, and Flint's sales talks sell.

The attractive style of these breezy and interesting talks as presented to the public is shown in the advertisement reproduced on this page. It is taken from one of Mr. Flint's many heart-to-heart talks in advertisements inserted in the local newspapers.

MEMORANDUM OF ORDER

Sale No. _____ Del. No. _____
Branch _____ Date of Sale _____
Name _____
Address _____
Type _____ Salesman _____
Delivery Estimate _____

EQUIPMENT	PRICES
Dem. Rims and Tires	
Extra Shoes	
Oil Gauge	
No. Brackets	
Tire Carrier	
Speedometer	
K. W. Lock	
Bumper	
Self starter	

IF TIME PAYMENT DEAL	EQUIPMENT TOTAL
Additional Cash on Delivery	Car Gas and Oil, Delivered
Notes	Insurance
	Lease
	Stamps and Tax
	Sum Total
	Credit by Deposit
Balance Due on Delivery	Balance Due on Delivery

ALL PRICES SUBJECT TO CHANGE BEFORE DELIVERY

Note deals must be accompanied by an insurance policy and loans and the notes must be paid at the bank with interest when due.

This order is subject to all the terms and conditions embodied in the Ford Motor Company's retail buyer's order and agreement.

We are not liable for failure to deliver car due to any cause whatsoever.

Fig. 4—Sales Memorandum of Order.

The operation of his automobile vehicle business does not fully occupy Mr. Flint, for he is the executive and the principal owner of the D. W. F. Engineering Co., a concern recently organized to manufacture metal specialties. The plant is splendidly equipped and it is now principally producing turnbuckles of the type used for aeroplane construction. Statement is made that the turnbuckles made by this company have extreme strength and are preferred by aircraft builders to other types. So great is the demand for the specialty that the plant is operated day and night to produce it.

The organization of the company and the establishment of its plant is characteristic of Mr. Flint's business policies and methods—making the most of an opportunity and obtaining results that are the best, both from the manufacturing and the sales viewpoints. The company now has contracts that will necessitate production to capacity for a considerable length of time.

Few men of Mr. Flint's age have been as successful as he. He has demonstrated the possibilites for the young, aggressive business man, and his businesses have been developed upon principles and policies that have received the approbation of those who have made notable successes in industry and commercial pursuits. He is deeply concerned in municipal, state and national affairs and is always one of the first to respond to all appeals to the public for patriotic, charitable or philanthropic purposes.

Mr. Flint has been too busy for the past few years to participate actively in his favorite sport, small yacht sailing, but for a long time he and his brother were of the leaders of the yachtsmen of Narragansett Bay, a coterie of amateur sportsmen who are known the world over for their skill and daring. The Flint pennant has been carried first over the line in innumerable hard-fought races, and has been flown on a series of yachts bearing the name Wanderer, probably the most consistently continued title in the history of American yachting, for it has identified the yachts of the Flint family for nearly half a century.

Ford
THE UNIVERSAL CAR

GLORIOUS NEWS

For over a week we've been quick-stepping to where the boy leaves the daily newspaper—hot in pursuit of the latest news from the Front.

On the whole, has it been disappointing news? No, NO, NO! Just the opposite—GLORIOUS NEWS! Those can't-be-licked Britishers, backed by brave French Soldiers and the fighting boys from good old Yankeeland, did wonderful work!

I guess every one of us is filled with sincere admiration for the armies over there—AND FOR THAT NOBLE ENGLISH GENERAL, SIR DOUGLAS HAIG! THREE CHEERS FOR HAIG!

LIBERTY BONDS FOR US

Saturday the drive is on. If we can't go to fight—we can stay to help. If we can't be one of the $1000 War Savings Stamp Limit Men—or can't buy a $5000 Liberty Bond—by George, what's the matter with our hitting 'er up for a $50 bunch of those 4½ per cent. coupons?

If we haven't the ready money—only a part—there are ways provided for us to make up the balance conveniently, without financial hardship. So don't try to flunk with that excuse.

In fact, don't flunk at all! Buy Liberty Bonds. Buy all you can chew! Everybody!—unless you're a self-confessed down-and-outer. And for Heaven's sake don't let anybody admit that.

ONE WAY TO GATHER A STOCK OF LIBERTY BONDS—

BUY A FORD CAR

Buy it because the cost is so enormously LITTLE! Because there's no extravagant waste—no attempt at overwhelming luxuriousness. Instead, FORD is the car of genuine comfort, of remarkable power, of dependability and of 100 per cent. value!

Cut out your first idea—to own a high-priced car this season and no Liberty Bonds. Buy a Ford Car instead. With the cost difference purchase enough Liberty Bonds so you'll have to hire a Safe Deposit Box to store them!

Ford Touring Car F. O. B. Detroit **$450**

Ford Runabout F. O. B. Detroit **$435**

Yours truly,

DUTEE W. FLINT

OPERATOR OF 20 FORD STORES IN RHODE ISLAND AND CONNECTICUT

Shop Tag and Delivery Check

Sale No. _____ Date _____ Salesman _____
Name _____
Address _____
Type _____ When Promised _____
Car No. _____ Checked By _____

EQUIPMENT

Dem. Rims & Tires _____
Extra Shoes _____
Oil Gauge _____
No. Brackets _____
Tire Carrier _____
Speedometer _____
K. W. Look _____
Self Starter _____
Bumper _____
Regular Tools and Equipment _____

Equipment Checked by _____
Shortage Noted _____

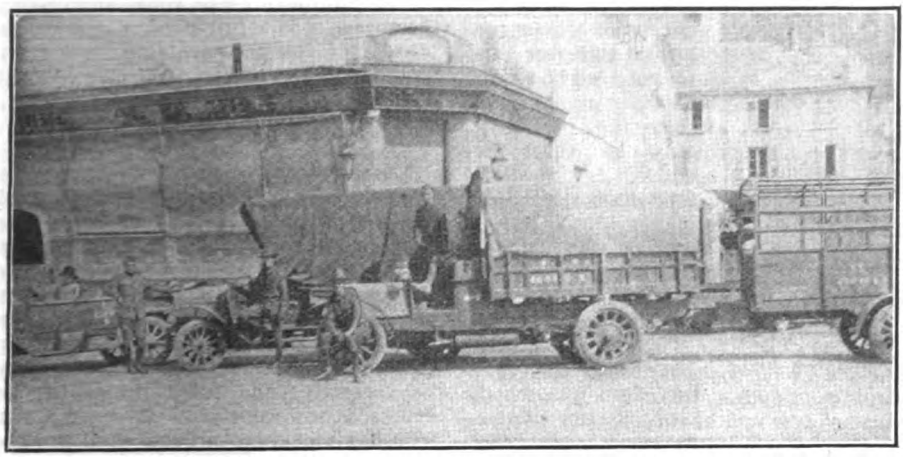
Shortage Checked by _____
Adjusted, Greased, Gas & Oil Checked By _____
Received Complete, Purchaser _____

Fig. 5—Shop Tag and Delivery Check.

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United War Work Campaign To Raise $170,500,000 For Welfare Service

BEHIND the American armies that are sweeping so valorously across the battlefields of France, and so close that at times they are in trenches, in dugouts, in shell craters and often under fire, are the welfare workers—the representatives of the different civic bodies that in normal times are institutions, organized and supported by individuals.



Knights of Columbus Truck Supply Train Leaving Paris for the Front Line Distribution Bases.

Today these organizations represent the American people. All soldiers are entitled to the comforts and conveniences and the supplies that each provides from whatever resources may be available. There is the same spirit of unity that has characterized the American soldiery wherever met. It is a striking evidence of the solidarity of the people of the United States.

At President's Request.

Until now each organization has solicited contributions individually. This has meant a great deal of unnecessary endeavor. At President Wilson's request the Young Men's Christian Association, the Young Women's Christian Association, the Knights of Columbus, the Jewish Welfare Board, the War Camp Community Service, the American Library Association and the Salvation Army have undertaken a single campaign, from Nov. 11-18, to raise $170,500,000, which shall be devoted to whatever uses may be determined by the committees that distribute the funds.

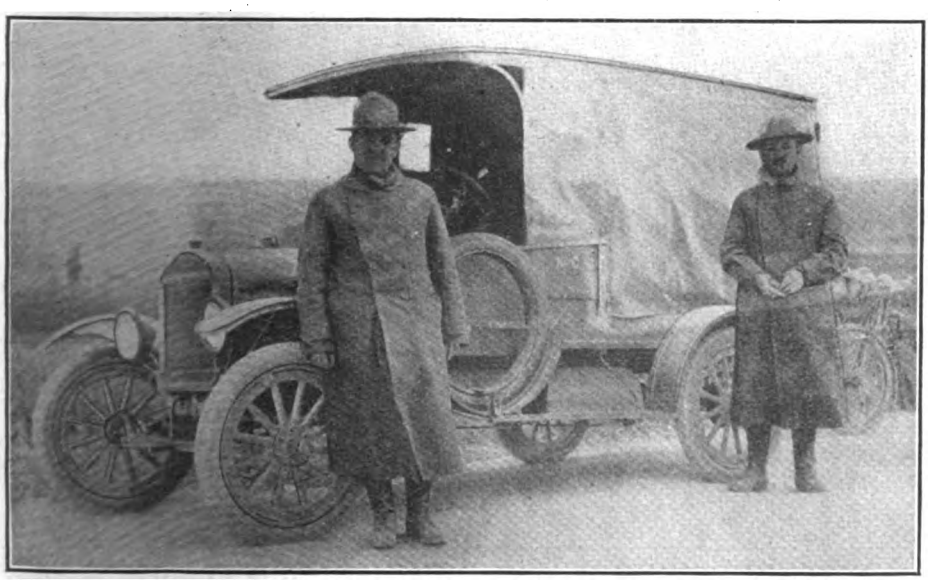
Were seven different appeals made, and seven different campaigns conducted, these would be less effective than one great drive that will be participated in by all organizations and for a common cause.

United War Work Campaign.

This united appeal will be known as the United War Work Campaign. It will be conducted by a national committee of 35 men and women, consisting of five representatives from each of the seven organizations. The chairman of the executive committee and the director general is John R. Mott, and the treasurer is Cleveland H. Dodge. This committee was organized within 24 hours after the receipt of the request of President Wilson, and it is now organizing its forces for the cooperative endeavor that will mean so much to the American patriots overseas.



Salvation Army Brigadier Greeted by Yankee Soldiers Resting While En Route in a Motor Truck.



Two Knights of Columbus Secretaries and the Trucks with Which They Follow the American Soldiers from Camp to Camp, at Home or Abroad.

Motor Cars Help Work.

This wonderful welfare work would be impossible were it not for the power vehicles used by the different organizations. There are bases where stores of all kinds are kept, and from which these are distributed constantly. That the reader may comprehend the work that is carried on and the great area that is traversed in this distribution, statement should be made that the seven accredited war service agencies have a combined

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Col. Barker of the Salvation Army and One of the Trucks Used to Carry Supplies to the First Line of American Army.

fleet of 1500 automobiles.

Six hundred of these are large trucks and are used to transport the supplies from the points of embarkation to the base warehouses in the intermediate zones, where the goods are sorted and classed for immediate delivery and distribution in the front line trenches.

For distributing 900 smaller machines are used. Each is under the direct charge of a secretary or representative of one of the seven war service organizations, who drives his load of supplies straight into the battle sectors, where it is distributed by the secretary and his assistants among our fighting troops. In this manner hundreds of tons of supplies, such as chocolate, candy, gum, cigarettes, cigars, tobacco and food are daily delivered without any charge whatever among the boys.

Secretaries Work Under Fire.

Unafraid, undaunted, without the slightest hesitancy, these welfare workers enter the lines of actual warfare and carry on their heroic and very necessary work under fire. At times they work 36 hours at a stretch when the fighting is hottest, and when assistance and food are absolutely essential to our tired troops. For a week at a time some of them are on duty from 18 to 20 hours a day without sleep. Occasionally, if not frequently, some of these welfare workers are wounded, some gased and some shell shocked while distributing their supplies, and rendering whatever other service they can for the welfare and comfort of our troops.

Operating in conjunction with the fleet of 1500 cars these seven organizations have 300 automobile camp kitchens. These also enter the battle sectors, and from them our boys are served with hot coffee, tea, chocolate, cocoa, bullion and solid food.

How the Work Is Organized.

In all cities where the War Camp Community Service provides a welcome for the man on furlough there is use for motor trucks to carry provisions to the clubs and canteens. In practically every camp community there are motor buses provided by the War Camp organization and its friends to show the chief points of interest about the city to uniformed visitors. In the cantonments themselves dozens of trucks ply hither and yon supplying soldiers' needs.

In the camps it may be that the truck is marked with the red triangle of the Y. M. C. A., or the sign of the K. of C., or the Jewish Welfare Board, or mayhap the Salvation Army, but in any case it is carrying supplies to canteens, which mean cheer in the life of the soldier, sailor or marine. In every camp, too, there are passenger cars bearing the blue triangle of the Y. W. C. A., transporting visitors to and from the Hostess House.

Certainly no unit of the motor army receives a more joyous welcome than that of the American Library Association, whether here or overseas, as it arrives at a camp library, a base hospital or a hut, laden with books and periodicals. Such a truck contains fiction and light matter, but best of all from the standpoint of the men are the technical books, which help them to understand the big job of winning war. In every phase of getting the books to the fighting man motors play a part. There is gathering the books from homes and places of purchase, transporting them to camps or to ships, where they are placed into transport libraries, and overseas there is the transportation to base hospitals, huts and canteens.

In all the soldier welfare work overseas motor trucks are in continual use, the Y. M. C. A. alone having more than 500 trucks and automobiles in use in France at the present time, and driving these trucks is a full sized man's job, as fording of streams, avoiding shell holes and climbing trench parapets are all every day events of the driver's life.

Drivers Must Be Mechanics.

The hundreds of men serving as drivers for the trucks are necessarily trained mechanics. Once started for the front a truck must not be held up, so the man at the wheel must be willing and able to "get out and get under" if necessary and make a speedy repair. However, the welcoming shout sent up at the arrival of the truck with its chocolate bars, its cigarettes and the makings for hot drinks, is reward enough for even a man who has ploughed through shell fire and impossible looking mud holes to get to his destination.

The seven organizations will challenge every boy and girl in the country to assist in this great work. There will be two divisions, the Victory Boys and the Victory Girls. The object of the Victory Boys will be to align a million boys behind a million fighters. Those enrolling in either division must pledge to earn and give an amount individually determined for welfare work among the soldiers and sailors, and this means that no boy or girl can give money he or she has not earned.



A Squad of Soldiers at a Y. M. C. A. Hut in a Shell Crater, Showing How Closely the Welfare Workers Follow the Flag. (C) Official Canadian Photograph.

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How Women at Home Can Serve.

The Red Cross has other needs besides those of serving abroad, for those who remain at home, especialy the women, can do a great deal of good by preparing to serve wherever there should be need. There are motor and ambulance corps organized under the Red Cross in thousands of communities, many of them with memberships of women. And some of these corps have instituted educational classes the better to fit their members for service. The accompanying illustration shows a class or women drivers of the Red Cross Motor Corps of Newark, N. J., whcih is receiving 12 lessons in car operation, adjustment and repair. With a stripped chassis to illustrate the subject the lecturer explains carefully to the class, and if necessary to each individual, the details of design, construction, adjustment and repair that can be practically made. Upon the completion of the series a written examination is held and on the average of each student a certificate of ability is issued. Several classes of this kind are studying automotive driving and maintenance at the sales rooms and service station of the Bonnell Motor Car Co., agent for Dodge cars and trucks.

PHILIP E. HAWLEY OF BOSTON VICTIM OF INFLUENZA EPIDEMIC.

Philip E. Hawley of the Hawley-Cowan Co., Boston, the New England distributors for the Saxon car and the Wilson truck, died in that city on Oct. 2, a victim of the Spanish influenza epidemic. Before coming to Boston Mr. Hawley was located in Detroit for a number of years. He was at one time identified with the Studebaker agency and later with the Krit.

GOVERNMENT NEEDS STENOGRAPHERS AND TYPISTS AT CAPITAL.

The United States Civil Service Commission has again sent out a notice of the great demand for stenographers and typists to work in the government office at Washington.

It is stated that those who take these positions will find satisfactory accommodations at the Capitol as the Room Registration Office of the District Council of Defense, at 1381 New York avenue, Washington, D. C., has on its list more than 4000 rooms, which have been carefully inspected and are available for new appointees. The usual charge for rooming accommodations with board is $40 a month, which includes two meals a day, In addition to these accommodations the government will soon erect residence halls, including cafeterias, for the use of government employees in Washington.

CHAMPION IGNITION CO. TO BUILD THREE-STORY ADDITION TO PLANT.

The Champion Ignition Co., Flint, Mich., is erecting a three-story addition to its plant, which will cost in the neighborhood of $30,000.

Many Opportunities For Tradesmen In Various Branches of Air Service

To provide for the needs of the recently expanded program of the air service, a drive has been started by Major Willard Wadsworth, department air service officer in New York, to build up a reservoir from which a constant supply of men can be drawn as occasion demands.

Arrangements have been made with the draft authorities to induct men who successfully pass the rigid requirements of this branch. As the result of a special ruling an opportunity is given to men over the draft age having the necessary qualifications to serve in the air service. Fifty-six is the new age limit fixed by the War Department. This ruling is hailed by Major Wadsworth as an important aid in obtaining a new supply of men.

"Heretofore we have been reluctantly compelled to turn down applicants who were more than 46," said Major Wadsworth. "The majority of those rejected their trades or at some work to which their trade makes them adaptable.

"The air service should appeal to all red-blooded men soon to be called in the draft who want to see service at the front," Major Wadsworth said. "The men in this branch are up where the "big doings" are. Men having the qualifications demanded are not giving of their best to their country if they do not come forward and enter the air service. It is very difficult to get men who are skilled in these trades, without whom it would be impossible to keep our planes in the air. There must be no slacking in our air program; production of aircraft has reached a quantitive stage, until at present there are more than 1200 De Haviland planes, 6600 training planes, 6000 Liberty Motors and 12,500 training engines. What we need now is the men to repair, assemble and fly the machines."

The pay of the enlisted men in the air service, it was pointed out, is higher than in most branches. The minimum pay is $30 a month, with allowances for food, clothing and lodging, but men showing capability may earn as high as $121.50 a month. Promotion is rapid, depending entirely on the man.



Women Drivers of the Red Cross Motor Corps of Newark, N. J. They Are Given a Course of 12 Lessons in Car Operation, Adjustment and Repair.

were skilled men and the service has suffered a distinct loss as a result of our inability to enlist them. It is hoped that they will reapply for enlistment."

The slump in applicants for the air service is thought to be due to a misunderstanding of the draft regulations, many persons believing that one subject to the draft cannot volunteer for any particular branch. The War Department has ruled that all men between the ages of 18 and 46 inclusive, not in class A1 of the draft of 1917 may apply for induction into the air service. This gives those who are armorers, auto body builders, auto and airplane mechanics, blacksmiths, chauffeurs, cabinet makers, carpenters, cobblers, draftsmen, engine testers and repair men, metal workers, motorcyclists, machinists, motor mechanics, magneto repair men, painters, propeller makers, riggers, photographers, tailors, truck masters, vulcanizers and welders an opportunity to enter the air service, where they may continue at

Applications are also being received again after a lapse of six months for commissions as fliers, bombers, observers and balloonists. With the expansion of the air service the waiting list of more than 6000 has been gradually used up and at present there is urgent need of student fliers. Similarly, as in the case of men having mechanical or technical training, applicants applying may be inducted into the service immediately to await assignment to a ground school.

Application may be filed at the office of the air service officer, room 902, 104 Broad street, New York. Information regarding any branch of the service will be given upon written application or personal visit.

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Personal News of the Industry in Brief



E. P. Chalfant, General Manager of Automotive Products Corporation.

E. P. Chalfant has resigned as eastern division manager of the Anderson Electric Car Co. and has been appointed general manager of the Automotive Products Corporation, an export house, which was organized last year by the American Steel Export Co. He is one of the best known men in the motor car industry, having been connected with it for over 15 years and was at one time general manager of the Association of Licensed Automobile Manufacturers. Later he was with the Packard and Thomas companies.

Les W. Place, sales manager of the Allen Motor Co., Fostoria, O., has resigned. He has not announced his plans for the future.

Norval A. Hawkins has entered the United States Army Ordnance Department as an assistant to Major George D. Wilcox, who has charge of the Motor Transport Service for the Detroit district. Mr. Hawkins is sales manager for the Ford Motor Co. and will resume his duties with the company when his services are no longer required by the government.

Frank W. Hodgedson is now at Washington connected with the Food Administration. He was formerly manager of the C. S. Henshaw Co., Dodge Brothers dealers, Boston.

F. J. Jarosch has become associated with the Liberty Engineering Co., Lancaster, Pa. He is secretary and manager of the company. This company was recently formed for consulting, designing, research and development work. Associated with him are J. E. Perkinson; vice president; C. W. Lea and treasurer, R. A. Heiland. Mr. Jarosch was formerly chief engineer of the Bearings Co. of America.

M. Bielweiss, who formerly served as assistant to sales manager and factory manager of the Premier Motor Corporation, Indianapolis, Ind., has been appointed manager of the planning department and stores of the Templar Motors Corporation, Cleveland, O.

Zeno D. Barns has become associated with the general department of the Aluminum Castings Co., Cleveland, O. He was for the past three years connected with the Westinghouse Air Brake Co. as non-ferrous metallurgist.

Fred W. Vormelker is now efficiency engineer of the Russel Motor Axle Co., North Detroit, and will have charge of all work pertaining to the following departments: Time study, routing, factory time, employment and efficiency.

Charles M. Steel has returned overseas to continue his work with the Y. M. C. A. He is located in Paris and is in entire charge of the entertainment division of the Y. M. C. A. work in France. He was formerly vice president of the Carl M. Green Co., Detroit, and has been on leave of absence for the past two months.

George T. Bryant is now sales manager for the Hide, Leather and Belting Co., Indianapolis. He was formerly connected with the Russell M. Seeds Advertising Agency. The Hide, Leather and Belting Co. are the manufacturers of leather belting and parts for cars, trucks and tractors.

Samuel W. Prussian has accepted a position in the quartermaster's department for the duration of the war. He is president and owner of the Guaranty Truck Co., Cambridge, Mass.

Clay C. Howery has become associated with the American Steel Supply Syndicate, Detroit, as general manager. The management has been reorganized and the company equipped with an extensive screw machine and heat treating department. The corporation is working entirely on government orders, manufacturing parts for engines. He was formerly associated with the production and purchasing departments of the Continental Motors Corporation, Detroit.



Guy E. Tripp, Appointed Brigadier General in U. S. Army.



Les W. Place, Sales Manager of Allen Motor Co., Resigns.

Guy B. Wright has joined the sales force of the Buda Co., Harvey, Ill. Since 1916 he has been western sales manager of the Stewart-Warner Corporation and previous to that time was connected with the Vacuum Oil Co. in various capacities for 14 years, being in charge of the sales of motor vehicle lubricants.

A. C. Dallach is now operating a large manufacturing plant at La Grange, Ill. He was formerly proprietor of the Machinery and Motor Co., Quincy, Ill., and has sold his interest to the E. C. Long Co.

B. F. Baldon, who was formerly manager of the Baldon Motor Service and Repair Co., Quincy, Ill., is now service manager with the Battery Electric Garage.

Glen Cutforth has taken the position as service manager with the Topeka Auto Co. He was formerly service manager with the Cutforth Brothers.

Frank D'Arcy has become associated with the Quincy branch of the Overland Automobile Co. as mechanical engineer. He was formerly manager of the Standard Oil Garage, Quincy, Ill.

C. W. Whitson has been appointed general sales manager of the Panhard Motors Corporation, Grand Haven, Mich. He recently resigned from the Fulton Motor Truck, Farmington, L. I.

Dan Cohen has been elected president and treasurer of the Fulton Motor Truck Co. of Newark, N. J. The company will distribute Fulton trucks in New Jersey.

Fred H. Miller is now connected with the Manhattan branch of the Packard Motor Car Co. For the past six years he was manager of the Brooklyn, N. Y., branch. Charles G. Embleton becomes Brooklyn manager.

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T. P. C. Forbes has been made assistant sales manager of the Fulton Motor Truck Co. For 10 months Mr. Forbes has been traveling representative for the Fulton.

E. M. McLein has joined the Oneida Motor Truck Co., Green Bay, Wis., where he will be connected with the office of the director of sales. He was formerly advertising manager of the Stegman Motor Car Co.

Charles E. Becker has entered the service and was formerly advertising manager of Jones Motor Car Co., Wichita, Kan.

Ralph J. Handy, who was formerly distributor of the Tonford truck attachments in Detroit, has become sales manager of the Lauton Truck Co., Youngstown, O.

W. G. Bell, for the last four years assistant sales manager in Canada for the Studebaker, has become Canadian sales manager of the Cleveland Tractor Co.

Frank L. Wurl has been appointed sales engineer of the Remy Electric Co., Detroit, Mich. He has been with the company for several years as electrical engineer, where he was head of the research laboratories.

Guy E. Tripp has been made brigadier-general United States Army and placed in charge of the production of ordnance material. General Tripp is succeeded as head of the Production Division by Colonel C. C. Jamieson.

Harry W. Ford has gone to Washington and is now associated with Colonel Barret Andrews in the reorganized Army Transport Corps under General Drake. He was former president of the Saxon Motor Car Corporation, Detroit, Mich.

George C. McMullen is now western representative of the Timken Roller Bearing Co. His headquarters are at San Gabriel, Cal.

S. A. Campbell, who was formerly sales manager of the Warnola Mfg. Co.,



Lafayette Markle, Former Assistant General Sales Manager, Republic Motor Truck Co.



Guy B. Wright, Formerly with the Stewart-Warner Corporation, Now with the Buda Co.

New York, is now associated with the Bay State Pump Co., Boston.

E. S. Ralph has become advertising manager of the R. & P. Tractor Co., Alma, Mich. For several years he was in the advertising department of the American Seeding Machine Co., Springfield, O.

Auguste Choteau has been commissioner a second lieutenant in France. He was former vice president of the Bittel-Leftwich Tire Co., St. Louis, and financial advisor of five other accessory companies.

Earl Moore is now local sales manager of the Moore Motor Car Co. in St. Louis, Mo.

Edward Kohlman succeeds R. L. Johnson as manager of the parts department of the Hudson-Phillips Motor Car Co., St. Louis, Mo. Mr. Johnson has been called to Camp Pike to begin training for a commission in the army.

Neal J. Downey has been appointed sales manager of all departments of the KisselKar Co., and the Edwards Motor Car Co., Milwaukee, Wis. The company is the distributor of the Kissel and the Dodge. For eight years Mr. Downey was manager of the used car department of the companies.

Emil Grossman has gone into business under the name of E. G. Manufacturing Co. at 50 West 54th street. The company's business consists of locating surplus stocks of automotive equipment and supplying jobbers whose stocks are short. Mr. Grossman was formerly president of the Emil Grossman Manufacturing Co.

C. L. Fox is now in Jacksonville, Fla., and is training in the Motor Transport Corps. He was formerly assistant sales manager of the Saxon Motor Car Co.

Donald F. Whittaker has become assistant to H. A. Conlon, vice president of the Acason Motor Truck Co., Detroit. He has charge of sales and was formerly advertising manager of the company.

Hamilton Olive has resigned as sales manager of the Federal Motor Truck Co., St. Louis, Mo., to become district sales manager for the Vim Motor Truck Co. of Philadelphia, Pa., in Oklahoma, Texas and Missouri.

C. O. Dixon has been appointed manager of the new branch of the Standard Roller Bearings Co. He has been for several years with the motor accessory department of the Shapleigh Hardware Co., St. Louis, Mo.

William A. Scharon has become associated as advertising manager of the tractor bearings division of the Hyatt Roller Bearing Co., Detroit. He was formerly connected with the advertising department of the Packard Motor Car Co. and the Timken-Detroit Axle Co.

Gorden G. Atwell, Nacogdoches, Tex., has been appointed by the Van Spring Oiler Co. of Chicago, their southern distributor. The Van Spring Oiler Co. is located at 222 N. Wabash avenue, Chicago, and make a complete line of Van Spring Oilers for pleasure cars. They are now working on a complete line of Van oilers for the trucks of America and will show these at the Chicago show.

V. C. Fuller has been made special traveling representative of the Bearings Service Co., Detroit, and attached to the main office in that city. He will visit the company's distributors. Mr. Fuller was formerly with the Dictaphone Co.

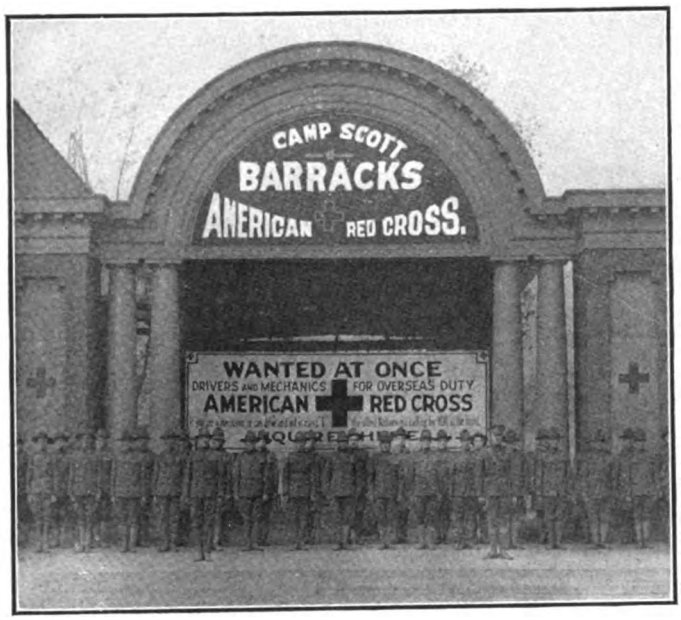
Lafayette Markle, for a considerable period vice president and assistant general sales manager of Republic company, has resigned that connection and will in future devote himself actively to the operations of the L. Markle Co. and the Chicago-Republic Truck Co., both of which he largely controls. When Mr. Markle joined the Republic organization he retained his interests in these companies and as they have increased in importance he must concentrate his endeavors upon them.



V. C. Fuller, Traveling Representative of Bearings Service Co.

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Automobile Drivers and Mechanics Needed



Entrance to Camp Scott, Chicago, Where Red Cross Volunteer Drivers and Mechanics Are Trained for Service Overseas.

DEVOTED to the relief of humanity suffering from any cause the work of the American Red Cross, which may consistently be termed the greatest charity the world has ever known, has increased almost beyond the comprehension of the average mind. The activities of the Red Cross are associated with the battle field, but this is but a part of what it has undertaken. Wherever there is need the Red Cross is always represented and its charities are bestowed upon all without regard to race, nationality or creed.

The American Red Cross is wonderful as an organization. Wherever warfare, disaster, famine or pestilence has caused injury, hunger or sickness, the Red Cross is regarded as the logical means of affording relief. It is doubly wonderful from the fact that its resources are given voluntarily by those who have confidence in its integrity of purpose and the wisdom of its benevolence. Its principal workers are all volunteers, who contribute their services because of the realization that they are directly benefiting mankind.

The Red Cross represents charity in its broadest sense. No matter what the emergency, its organization has always been found adequate to the needs. Without hesitancy all the people of the United States have supplied the funds and the workers have volunteered in numbers sufficient to afford quick and efficient relief.

When the European war begun the American Red Cross joined with other Red Cross bodies and distributed its charities wherever there was need. Because military operations were of magnitude never before undertaken needs were enormously increased. The Red Cross required millions where it has needed thousands in money and thousands of permanent workers where but small forces, serving temporarily, were necessary.

Wherever war operations developed the Red Cross followed the flags. When the United States declared war and the American soldiers joined with the Allied nations on foreign soil, the needs of the Red Cross increased immeasurably. Appeals for funds and for workers were made and were met with a spirit that was as patriotic, as was evidenced by those who carry the colors—always forward and never backward to the victory that is certain to reward American unity and valor.

The Red Cross now has thousands of workers overseas. It has an organization perfected that is marvelously efficient. The relief it affords cannot be measured by terms that can be comprehended by the average mind, because values are represented by lives saved, by suffering relieved, by comfort bestowed and by gratitude that at best can only be expressed in words.

The policy of the Red Cross has been to ask the people to contribute money and to appeal to those who wish to participate in the noble and unselfish work that is so universally needed. There are, of course, many thousands who because of conditions and lack of resources would not be able to give their services entirely without compensation, and to those who will serve in differing capacities the Red Cross gives such pay as it consistently can.

The Compensation for Services.

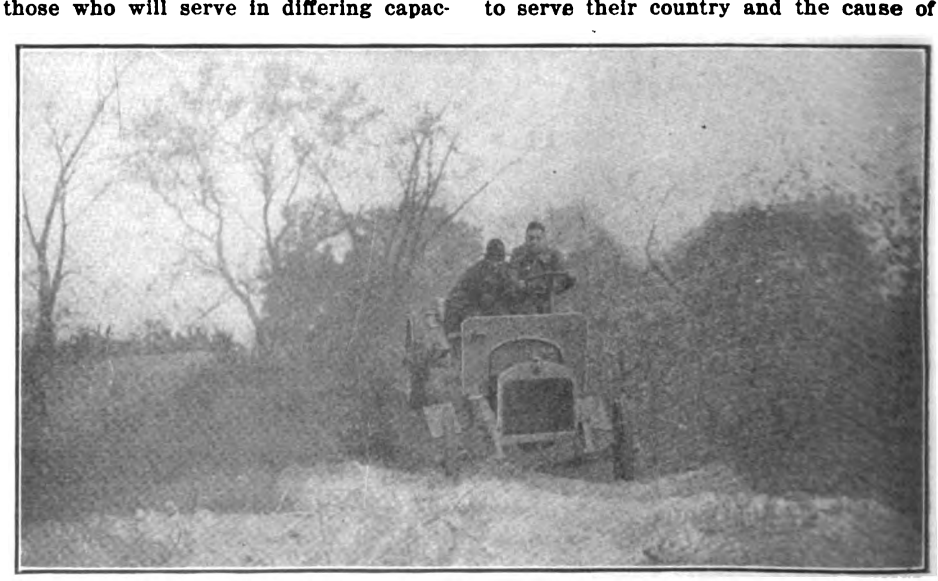
The compensation for activity in Red Cross work is not what is paid in money. It is the knowledge that one is serving one's country and its cause just as patriotically, just as earnestly and just as devotedly as though one was with the flag. And thousands of the Red Cross workers are with the colors, serving on the battle field and doing their part as fearlessly and as nobly as those who man the artillery or tanks or aircraft; as those who in the trenches and on the open field bear the brunt of the assault or the attack; as the men who are combing the seas in destroyers or standing at the guns of the battleships awaiting the appearance of the German fleets in the open.

True it is that they do not bear arms, and they are not combatants in the sense that they win victories, but they are just as much a part of the great American army that is battling for Liberty across the seas as though they wear the khaki and insignia of the world's greatest republic.

The constant flow of American troops overseas, the gradual growth of the Allied armies, and the almost continuous conflict since early last spring has made demands upon the Red Cross that can only be met by volunteers for service for the duration of the war. The American army inspired the Allies with new valor, its example and invincible spirit has turned the tide that is now sweeping across France and Belgium, and will not be stayed until Germany has been forced to submit and the menace to the security of all the nations of the world has been dissipated forever.

Red Cross Wants Volunteers.

The American Red Cross wants men who can drive and who can serve as automobile mechanics for service in France. It wants men who are willing to serve their country and the cause of



Drivers and Mechanics Training for Red Cross Service at Camp Scott Driving a Truck Through a Stretch of "No Man's Land."

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By Red Cross Service For Overseas Duty

humanity until there is no longer need. It wants men who will make the sacrifice of their time and endeavors because of the common reward for mankind. And it needs these men more urgently than words can imply when seen in printed form. The Red Cross organization is superb. It is not willing that men shall engage in work abroad unless they are trained and equipped for specific service. The volunteers for Red Cross drivers and mechanics are needed for the transportation department, that division that delivers the supplies from the bases to the field and line hospitals, that conveys the wounded and sick from the front to the rear.

All men who respond to the appeal are sent to the base at Chicago, where the Red Cross Automotive and Mechanical Bureau is located. A training camp and barracks known as Camp Scott has been established at 6046 Cottage Grove avenue, which is commanded by Major H. P. Harding, a well known automotive engineer of Chicago. That the men can be sent overseas as quickly as possible and at the same time fit them so they can do their work intelligently and well, a rigid course of training, continuing about four weeks, is given.

How Volunteers Are Trained.

The volunteers are uniformed and they are trained to discipline that will be beneficial to the service and to themselves. At the barracks there is a complete automotive shop, where cars and trucks are assembled and reassembled. This work is directed by competent instructors, and besides the assembling and study of all mechanical functions the men receive demonstrations of all probable accidents and failures and are taught the quickest methods of determining the cause and making restoration.

Grounds have been laid out on which men are taught to drive trucks and cars through, around or over obstacles. Some of these sections represent conditions that might be expected in No Man's Land. Large pits, for instance, resemble shell holes; piles of brick and debris are spread over the paths or tracks and the men are required to drive at certain speeds with certain loads through these paths before they are given ratings as drivers.

Lectures and Actual Work.

The men are taught by series of lectures by leading engineers of the automotive industry. The subjects are taken up systematically. Men who are managers and the heads of large enterprises give their time to teaching the men what they ought to know of theory. Some of these engineers are authorities. Others are connected with some of the largest specializing concerns, the makers of bearings, carburetors, magnetos, ignition systems, tires, etc., and other authorities lecture on topics that will prepare the men for the work, and make them self-reliant and resourceful. From time to time Red Cross officials address the men and give them first hand information of the service they are to engage in and what will be expected of each volunteer. Each week every possible damage from breakage or failure of a truck or car is covered by lectures and actual field demonstrations.

The men daily engage for several hours in repair work of all kinds and in some instances building new cars. The Red Cross has made arrangements with about 100 garages and repair shops in Chicago so that the men will have the best kind of intensive training under highly competent instructors. The work is graded and marks are given daily, the methods of grading being the same as is used in technical schools.

These garages display signs as follows:

All Repair Men and Mechanics
in This Garage Are
RED CROSS MEN
Training for Overseas Duty.
Stand by the Colors.

Nominal charges are made the public for the work that is done by the volunteers, which are turned in to the Red Cross and the fund used to purchase additional equipment. While the men are overseas they are paid $40 a month and maintenance, and while training they receive half pay and maintenance. On the date of embarkation for Europe the men each receive a paid up insurance policy for $1000. The service is open to men under 18 years and over 45 years of age, or those rated in classes 5, 4, 3 and 2.



Red Cross Volunteers at Camp Scott Making a Repair in the Field, a Part of the Work Done During the Training Period.

TARVIA USES ON PRIVATE ESTATES.

An extremely interesting booklet has been prepared for the Barrett Co. by the Erikson Co., advertising counsel, New York City, which is devoted exclusively to the illustration of uses made of Tarvia in constructing drives and walks on private estates. There is some description of the manner of application and the results obtaining, but the greater part of the pamphlet is given over to illustrating drives and roadways about residences and private clubs in different sections of the country. The properties are both large and small and the effect of smooth and dustless roads is interestingly presented by a series of admirably chosen subjects. The publication may be obtained from the Barrett Co. through its New York office or its numerous branches.

NEW TOWN ON LINCOLN HIGHWAY IN NEBRASKA.

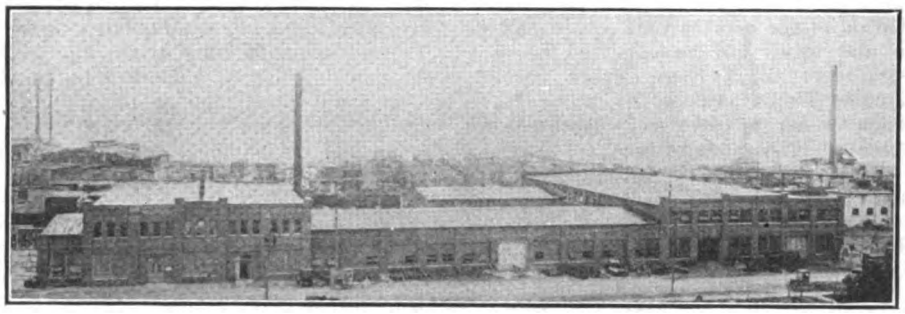
A new town has grown up upon the route of the Lincoln Highway between Clarks and Silver Creek, Neb., its sudden growth recalling to mind the rapid developments of a similar character of pioneer days. The new community is known as Havens. It will serve as a commercial center for the rich agricultural country surrounding.

A crew of shovelers kept the snow cleared away from the concrete sections of the Lincoln Highway leading into Fort Wayne last year, and traffic continued without interruption. It is planned to provide the same measure for keeping this highly important thoroughfare open to travel during the coming winter.

A Lincoln Highway conference has just been held at Akron, O., between President A. F. Seiberling and Secretary A. F. Bement, covering many important phases of the activities of the National Association.

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Reports of Activities In the Motor Industry



New Office Building and Units of the Plant of the Acme Motor Truck Co., Cadillac, Mich., Just Completed and Occupied.

The Acme Motor Truck Co., Cadillac, Mich., which was established several years ago, has developed rapidly. The company has produced machines built from highest grade standard construction units, its sales and service policies have been sound and satisfactory, and the progression has been consistent with good business principles. The company built its own plant and when this and its facilities were inadequate it acquired the shops and equipment of the Cadillac Machine Co., which increases the floor area of the works to about 120,000 square feet, an addition of about 70 per cent. to the manufacturing space. The company is extremely well prepared for production, and it has adequate financial resources, now having total assets of approximately $900,000, which are sufficient for all requirements.

The second addition made this year to the body building department is practically complete and will shortly be occupied and operating. Since it began the manufacture of bodies the output has increased very rapidly, many buyers having their equipment supplied by the company. The company occupied its new offices early the present month, this department requiring rather more than 9000 square feet of floor space, which is pointed out as an evidence of Acme growth and progress.

The Chicago Pneumatic Tool Co. for the six months ending June 30 reports profits of $889,009. Shipments for the first six months of the year were valued at $5,179,318, as compared with $3,926,703 for the corresponding period of 1917.

The Sun Motor Car plant at Elkhart, Ind., has been sold to W. L. Huffman of Omaha, who will use it as a truck factory.

The Auto Indicator Co., Grand Rapids, Mich., has been reorganized and will continue the manufacture of the four-in-one safety signal. Its new capitalization is $50,000 and the officers are: W. W. Huelster, president; E. C. Cilley, vice president; Joseph Renihan, secretary and treasurer.

The King Motor Car Co., Detroit, Mich., has announced a new price schedule, which went into effect on Sept. 23. The touring car has been advanced $220 to $2370, and the foursome has been advanced a similar amount to $2570. The price of the sedan on the new list is $3200, an increase of $250.

The Chevrolet Motor Co. has sent out a notice to stockholders of a meeting to be held in Wilmington, Del., Oct. 11, at which they will be called upon to approve the plan calling for the dissolution of the company and the distribution of its assets, which consist of 732,684 shares of the common stock of the General Motors Corporation. This stock will be distributed to Chevrolet stockholders on the basis of 1 1/7 shares of General Motors Corporation common stock for each share of Chevrolet Motor Co. stock. The various operating subsidiaries under the name of the Chevrolet Motor Co. will be retained as going companies, the plan calling for the dissolution of the Chevrolet Delaware corporation only.

John N. Willys, president of the Willys-Overland, Inc., has secured control of the Moline Plow Co. of Moline, Ill, one of the largest manufacturers of tractors and farm implements in the world. In addition to the main plant the company has over 20 branches

The Streator Motor Car Co., formerly of Streator, Ill., will be disposed of in a foreclosure sale which has been set for Thursday, Oct. 10, at Ottawa, Canada.

The McGraw Tire and Rubber Co., East Palestine, O., has made a slight advance in certain sizes of casings. Dealers discounts remain unchanged.

The Kales Stamping Co., Detroit, Mich., manufacturers of pressed metal parts, is building a two-story addition to its factory on Lafayette Boulevard. The building is 47x67 feet and contains 6000 square feet of floor space. It will be used for storage and stock purposes.

The Detroit Twist Drill Co., Detroit, Mich., has erected an addition to its plant, 33x70 feet., with 6100 square feet of floor space.

The Chandler Motor Car Co., Cleveland, O., has declared a regular quarterly dividend of $3 a share, payable Oct. 1 to stockholders of record Sept. 20.

The Standards Parts Co., Cleveland, O., has declared a regular quarterly dividend of 1¾ per cent. on the preferred stock, payable Oct. 1.

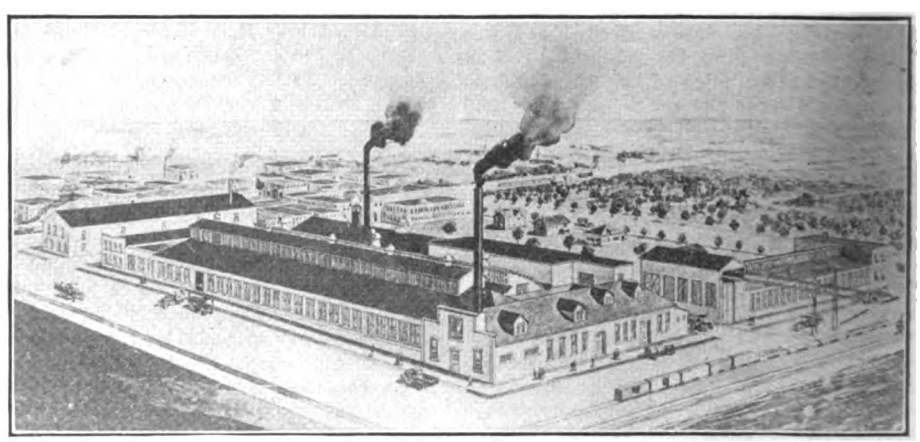
The Oakland Motor Car Co., Pontiac, Mich., is erecting two additions to its main plaint, one on either side of the entrance. The new quarters will be ready early in November and will provide additional office space, room for employees lockers, recreation and an expansion of the hospital ward.

The Goodyear Tire and Rubber Co., Akron, O., has declared the regular quarterly dividend of 1¾ per cent. on preferred stock.

Edward S. Smidt and J. H. Knox, 238 Central avenue, Newark, N. J., doing business as the S. & K. Specialty Co., with a factory at Irvington, N. J., have purchased the manufacturing and selling rights of the International lens, an anti-glare device for automobile head lamps.

The U. S. Rubber Co. has planned an issue of $6,000,000 five-year seven per cent. notes which, it is understood, will be used in refunding the $9,000,000 issue of General Rubber Co. debentures, which are due Dec. 1.

The Portage Rubber Co., Barberton, O., has declared a quarterly dividend of 1¾ per cent., payable Oct. 1 to stockholders of record Sept. 20.



Works of the Cadillac Machine Co., Cadillac, Mich., Recently Purchased by and Now Known as No. 2 Plant of the Acme Motor Truck Co.

The H. H. Franklin Manufacturing Co., Syracuse, N. Y., makers of the Franklin air cooled car, have received a contract from the Wright-Martin Aircraft Corporation for parts of Hispano-Suiza engines.

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And Happenings Among the Parts Makers

The Kissel Motor Car Co., Hartford, Wis., has been granted a patent covering its All-Year Cab for trucks and cars. The patent covers the interchangeable features of the cab as well as an interchangeable driver's seat.

The Stewart-Warner Speedometer Co., Chicago, Ill., has liquidated the remainder of its outstanding notes, which leaves no outstanding indebtedness except in current accounts. It is expected that net liquid assets of $5,000,000 will be revealed by the Oct. 1 balance sheet. The company is now on a 50 per cent. war basis, and additional war work is being taken up.

The Chandler Motor Car Co. has already delivered 100 of the 10-ton caterpillar tractors for the army and at present rate of production will have 1000 completed by January.

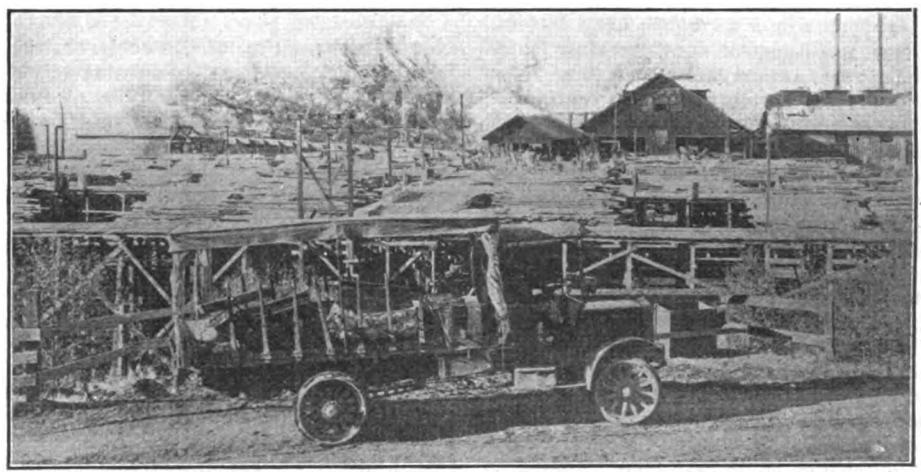
The Paige-Detroit Motor Car Co., Detroit, Mich., will be on a 100 per cent. war basis early in January. Only a few passenger cars are now being turned out, the bulk of the production at the plant being munitions.

The Schacht Motor Car Co., Cincinnati, O., has doubled its floor space and manufacturing facilities through the erection of a large addition to its plant. Production on the larger scale will begin about the first of November, when fully 80 per cent. of the output will be government work.

The Liberty Carburetor Co., Detroit, Mich., has been organized to manufacture a special carburetor for the Ford car and which will be known as the Liberty. Jere McCarthy, president of the McCarthy Motor Sales Co., is head of the new company.

The Auto Body Co., Lansing, Mich., has received an order from the government for truck bodies, valued at approximately $500,000.

The Olds Motor Works, Lansing, Mich., will be on a 100 per cent. war work basis by the first of the year. Deliveries on the order for 2000 kitchen trailers will be made this month and production will also be begun on an order for Liberty engines.

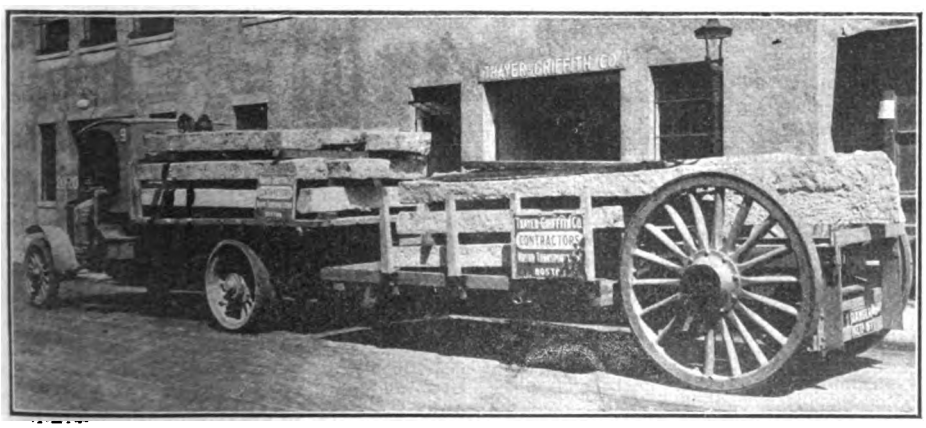


One of the Fleet of Five 3½-Ton Federal Trucks Used in the Operations of the Madera Sugar Pine Mills in California.

The Kuenz Radiator Co., Toledo, O., has been incorporated with a capital stock of $100,000 to manufacture radiators for De Haviland airplanes. The incorporators are: President, J. H. Armstrong of Cutting, Armstrong & Smith, Detroit, makers of motor car parts; vice president, J. A. Kuenz; secretary, S. E. Cobin; assistant secretary and general manager, E. C. Shields; treasurer, Charles D. Cutting.

C. R. Baker is now general manager of the Cadillac Sales Co. of Knoxville, Tenn. He has had wide experience in the automobile field, having been factory branch manager of the Akron, O., branch of the Ford Motor Co. and assistant manager of the branch at Cleveland.

Grover C. Phillips has been appointed an instructor in the quartermaster's department at Camp Joseph Johnson, Florida. He was formerly manager of the Phillips Garage of Chillicothe, Mo.



A Semi-Trailer Adapted for Heavy Haulage with a Five-Ton Truck, the Equipment as Shown Being Utilized for Carrying Stone.

Peter H. Davies, in the sales department of the Grand Rapids, Mich., Overland Co. for a number of years, has been made head of a special department in charge of truck sales development.

P. C. Christman has severed his connection with the Gill Piston Ring Co. as treasurer and general manager and has been succeeded by L. H. Phelps. Mr. Phelps will assume full charge of Mr. Christman's duties in the Gill Piston Ring Co., the Bearings Co. of Pennsylvania and the Chalsmith Sales Corp. Mr. Christman is going into the government service.

The Marathon Tire and Rubber Co., Cuyahoga Falls, O., presented its employees with an Honor Flag as every person on the pay roll subscribed to the Fourth Liberty Loan.

J. H. Faw, Inc., 37 Warren St., New York City, have added an assortment of link fuses to their already extensive line of fuses and are also distributing a chart which shows what particular fuse is needed on any car.

The Kissel Motor Car Co., Hartford, Wis., has announced the following list of new factory dealers: Marvel Motor Co., Kline, Col.; Hunsperger & Son, Corballia, Ore.; Oswalt Garage, Tuscaloosa, Ala.; Wade Motor Co., Calera, Ala.; Wade Motor Co., Centerville, Ala.; Kracl Bros., Rogers, Neb.

The Delion Tire and Rubber Co., Trenton, N. J., has increased its capital from $700,000 to $1,000,000.

The Chalmers Motor Corporation stockholders have ratified the plan for reducing the capital stock of the company from $7,060,000 to $6,400,000 by the cancellation of 132,000 shares of common stock, which was held in the treasury. The capital stock now consists of 400,000 shares of common without par value and 44,000 shares of the preferred with a par value of $100.

The Maxwell Motor Co., Inc., for the year ending July 31, 1918, made a net income of approximately $2,400,000, which amount does not include the excess profits tax or corporation tax in excess of six per cent.

The Oakland Motor Co., Pontiac, Mich., advanced the price of all Oakland models on Oct. 1 $100, the touring car and roadster being listed at $1285 in the new schedule and the sedan and coupe at $1860.

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Government Bureau of Standards Tests Anti-Freezing Solutions

The question of anti-freezing solutions for automobile radiators was brought very forcibly to the attention of users of motor vehicles last winter, and many requests for information regarding their use were received at the Bureau of Standards. An investigation was undertaken by the bureau to establish the value of these compounds and sufficient data have recently been obtained to justify a preliminary statement. These tests were made on the metals (such as brass or copper and solder) that are used in radiator construction and in the same combinations that are used in such construction. This is necessary in order to obtain the electrolytic action, which is largely responsible for radiator corrosion. Tests made without regard to electrolysis are practically worthless. This work will be continued, tests equivalent to service conditions will be made and a more comprehensive report given at a later date, but in time for use during the coming winter.

The ideal anti-freezing compound is one that will prevent freezing of the radiator liquid without injuring either engine or radiator, that will not lose its nonfreezing properties after continued use and that does not materially change the boiling point of water when dissolved in it.

Two Types of Compounds.

There are two general types of these compounds—one a solution in water of alcohol or glycerine, or a mixture of the latter two, the other a solution in water of calcium chloride or the dry salt itself, which contains sometimes small amounts of other substances, such as salt, sal ammoniac, sugar or syrup. Kerosene and similar oils, without admixture, are some times used.

Kerosene has a lower freezing point and higher boiling point than water, but the inflammability of its vapor makes it dangerous to use, and its high and uncertain boiling point might lead to the serious overheating of the engine, or even to the melting of the solder in the radiator. It has a marked solvent action on rubber parts. These facts would seem to clearly indicate that this material should not be used.

The alcohol-water type is the most common and is not generally sold under any trade name but recently there have appeared on the market a number of anti-freezing compounds of the calcium chloride type. These compounds are sold under a variety of names and startling claims are made for their effectiveness and lack of injurious effects.

The effectiveness of all properly prepared compounds, that is, their ability to prevent freezing, needs no discussion. The injurious effects, however, cannot be safely disregarded.

TABLE GIVING THE FREEZING POINTS OF SOME ALCOHOL AND GLYCERINE ANTI-FREEZING SOLUTIONS.

Temperature are given both in degrees Centigrade and degrees Fahrenheit. The figures in parenthesis are specific gravities at 60 degrees Fahrenheit. Percentage (by volume) in water and freezing points.

	10 pct.		20 pct.		30 pct.		40 pct.		50 pct.	
	Cen.	Far.	Cen.	Far.	Cen.	Far.	Cen.	Far.	Cen.	Far.
Denatured alcohol.....	—3	+27	—7	+19	—12	+10	—19	—2	—28	—18
	(0.988)		(0.978)		(0.968)		(0.957)		(0.943)	
Wood alcohol.....	—5	+23	—12	+10	—19	—2	—29	—20	—40	—40
	(0.987)		(0.975)		(0.963)		(0.952)		(0.937)	
Glycerine ..... (Sp. Gr. 1.2537)	—2	+29	—6	+21	—11	+12	—18	0	—26	—15
Denatured alcohol and glycerine*	—4	+25	—8	+18	—13	+9	—22	—8	—32	—26
Wood alcohol and glycerine*	—4	+25	—9	+16	—15	+5	—24	—11	—35	—31

*Glycerine and alcohol are mixed in equal proportions. Ten per cent. glycerine and denatured alcohol means 10 parts of mixed glycerine and alcohol, or five parts glycerine and five parts alcohol should be added to 90 parts of water.

The alcohol solutions do not exert a greater corrosive action than water alone. This can be predicted from theoretical considerations and is well established in practise. However, wood alcohol some times contains free acid, such as acetic acid, which is objectionable, and for this reason wood alcohol should not be used unless it is known to be free from acids.

The calcium chloride compounds exert a greater corrosive action than water on the engine jacket, on the solder in the radiator and on aluminum, which is some times used in manifolds, pumps and headers. The effect on engine jackets may be neglected since these are generally sufficiently heavy to permit considerable corrosion without being weakened. The effect on soldered joints may be serious, since tests made at the Bureau of Standards have shown the complete removal of solder from copper and brass when immersed in a hot 20 per cent. calcium chloride solution for four days. A number of such tests were made and there was always a more rapid corrosion or eating away of solder in these anti-freezing compounds than in water.

Calcium Chloride Solutions.

Calcium chloride solutions corrode aluminum very rapidly. The effect is variable, depending on the kind of aluminum used; blisters appear on ordinary rolled sheet aluminum and as these break the metal separates into scales or plates of corroded aluminum, which open up like the leaves of a book; cast aluminum, especially the copper alloys, show very decided pitting and etching. These tests show conclusively that the corrosive action will be very serious and it is difficult to reconcile these results with the current statement that the effect of calcium chloride solutions on aluminum is not very serious.

Another troublesome effect of calcium chloride solutions is experienced if small leaks occur in the radiator, the water jackets, or connections, and the solution comes in contact with the spark plugs and ignition wires. In some cases the drops of the solution may be carried back on the engine in a more or less atomized state, assisted by the fan when running. The salt deposited when the water evaporates is very difficult to remove and when it cools absorbs water and becomes a good electrical conductor, short-circuiting the spark plugs and some times making it impossible to start the engine. The difficulty may disappear when the engine is heated up.

There are also certain conditions in the manufacture of calcium chloride which may result in a compound that will deposit large crystals in the radiator as the solution cools; this may prevent effective circulation.

Regardless of these objections, reports have been received to the effect that calcium chloride solutions have been used a number of years in the same radiator without producing apparent corrosion. Nevertheless, such solutions cannot be recommended as safe, and they should not be used if there is any aluminum in the cooling system.

The chief advantage of calcium chloride compounds is that they are not volatile. The solutions can be kept practically uniform by adding water from time to time Unfortunately this is not true with the alcohol solutions, because the alcohol continually boils out and it must be replaced frequently in order to maintain the proper proportion of alcohol. Glycerine is frequently substituted for part of the alcohol to reduce evaporation, but when glycerine is used the rubber connections may be affected somewhat seriously, depending on the quality of the rubber. The most practical method to maintain the proper quantity of alcohol in the solution is to determine the specific gravity of the liquid by means of an hydrometer and by reference to the appended table add the necessary quantity of alcohol to obtain the desired gravity. Care should be taken to have the solution thoroughly mixed and as the specific gravities given in the tables are obtained at 60 degrees Fahrenheit, the specific gravity should be measured when the temperature of the solution is between 55 degrees Fahrenheit and 65 degrees Fahrenheit.

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The solution may then be kept at the proper strength from day to day by adding alcohol until the hydrometer reads the same as when first noted.

In order to illustrate how a non-freezing solution is prepared by using the table, assume that the lowest temperature anticipated is 19 degrees above zero Fahrenheit and that denatured alcohol is to be used.

By reference to the table in the line marked "denatured alcohol" + 19 degrees Fahrenheit is found in the 20 per cent. column and the specific gravity of that solution is 0.978.

If the radiator holds 3.5 gallons 20 per cent. of this must be alcohol and the remaining 80 per cent. water. Twenty per cent of 3.5 gallons (3.5x.20=0.7) is 0.7 gallon, or a little more than 5.5 pints. Hence a little more than 5.5 pints of alcohol will be required. This should be added to enough water to make 3.5 gallons, i. e. the water used will be 3.5 gallons—0.7 gallon or 2.8 gallon; a little more than 11 quarts.

If the temperature of this solution is brought to 60 degrees Fahrenheit and an accurate hydrometer is floated in it the hydrometer should read 0.978. If the reading is higher than 0.978 more alcohol should be added with constant stirring until the 0.978 mark is reached. (An accurate hydrometer should read 1.000 when placed in water at 60 degrees Fahrenheit and 0.834 in 180 degrees proof alcohol at the same temperature. The denatured alcohol usually sold by dealers is 180 degrees proof, which is the minimum allowed by law.)

A solution so prepared will not begin to freeze until its temperature is approximately + 19 degrees Fahrenheit.

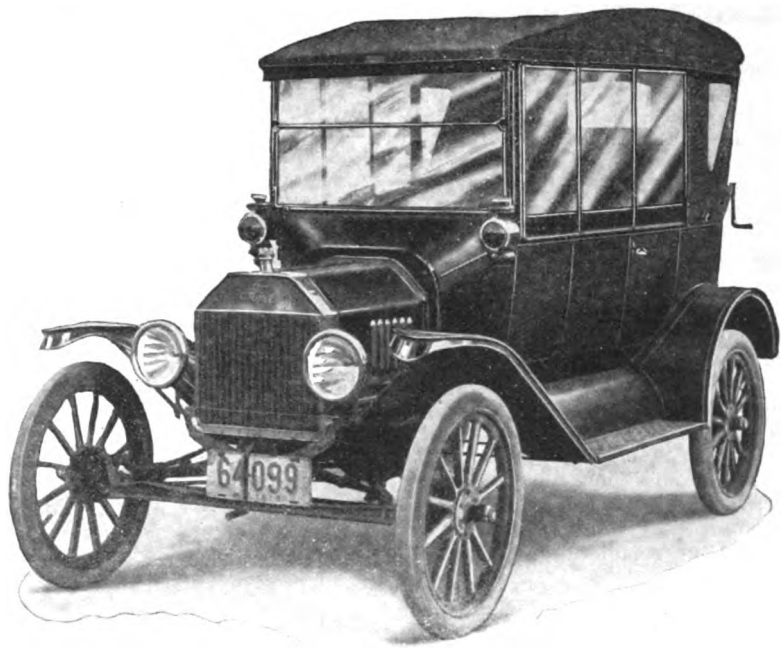
A careful consideration of the question of anti-freezing solutions for radiators leads to the conclusion that (1) calcium chloride compounds should be used with caution, if at all, on account of their corrosive action; (2) kerosene or similar oils should not be used on account of their inflammability, high boiling point and effect on rubber; (3) mixtures of glycerine and alcohol can be used, but the price of glycerine, and the need for it in the manufacture of munitions at the present time should preclude its use; (4) solutions made from either wood alcohol or denatured alcohol seem at the present time to be the most desirable anti-freezing solutions to use. If the wood alcohol is free from acid there is little choice between the two alcohols. Wood alcohol costs more than denatured alcohol and is more volatile, but its lower freezing point allows a less amount to be used, which may counteract the above disadvantage.

Numerous tables have been published giving the freezing points of certain water solutions containing alcohol, glycerine or a mixture of the two, but there is much disagreement in the figures given.

There is appended a table of freezing points obtained from actual measurements made at the Bureau of Standards, on solutions of commercial materials, which may be considered sufficiently accurate for practical purposes, since they agree fairly well with the most reliable scientific data.

The freezing point is taken to be that temperature in the cooling process at which crystals begin to form. The temperature at which the entire mass becomes solid may be several degrees lower than the freezing point for dilute solutions, and 10 or 15 degrees lower for the more concentrated solutions.

As an example, a 30 per cent. solution of denatured alcohol begins to freeze, that is small crystals of ice form, at seven degrees Fahrenheit, but the solution does not freeze solid until a temperature of — five degrees Fahrenheit or lower is reached. Hence a temperature considerably lower than that given in the table for any given percentage of alcohol would not injure the engine or radiator. However, it seems desirable to keep the solution at such a concentration that ice crystals will not form at the lowest temperature to be encountered, since such crystals may interfere with circulation.



The "A-W" All-Weather Convertible Top Installed on a Ford Touring Car Giving Complete Protection to the Occupants.

A CONVERTIBLE TOP WITH GLASS DOOR AND WINDOW PANELS.

The idea that automobiles were toys and should be used only in clement weather and on good roads, passed years ago with the marketing of the many devices that insure the operator and passengers of comforts on cold and stormy days that make driving in the open more satisfactory than riding in trains. Of these many devices for providing against the unpleasant features of winter weather none have contributed so much to the satisfying results as the convertible top, which can be put in position in a few minutes or folded back again in as short a time, giving the owner all the protection required, while at the same time adding little weight to the load carried to the car or incurring the expense of a permanent enclosed top or that of keeping an enclosed car for winter and a touring type for spring, summer and fall use.

One of the most serviceable of this type of tops is the "A W" all-weather convertible top. In designing it the makers kept in view the various points that a motorist would consider in judging a top and have produced a product which not only meets the essential requirements of a convertible top as a protector for the passengers against the elements, but one that adds to the appearance of the car when up, and in which every detail of workmanship indicates that the maker's idea for a superior product has been carried out. It is, however, simple in construction, a feature which greatly enhances its value as there are no complicated parts or mechanisms to cause trouble or to rattle and squeak.

It consists of a patented "one-man" top, shaped to conform to the lines of the car body and of removable windows made of glass, enclosed in light steel frames, which are carried in the car at all times. The top frame is made of steel covered with flexible weather proof material and is lighter and more resilient than a permanent wooden top. The door panels open with the door, an arrangement that eliminates the use of side curtains.

It has very graceful lines, which follow those of the car, and there is no overhang or other disfiguring projections. There are different sizes for all makes of cars.

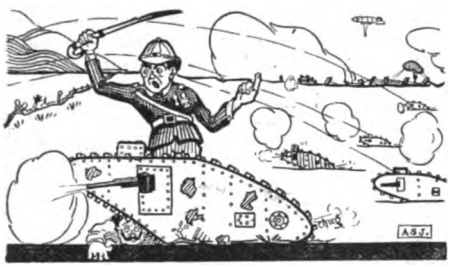
The "A W" all-weather convertible top is manufactured by the Adams-Williams Manufacturing Corporation, 351 West 52nd St., New York City.

CHESTER I. CAMPBELL HONORED BY BOSTON AUTOMOBILE DEALERS.

Chester I. Campbell, secretary of the Boston Automobile Dealers' Association, was recently tendered a dinner by the members of that organization as a testimonial to his work as manager of the government's war expositions. President J. H. MacAlman presided.

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GRAPHICS



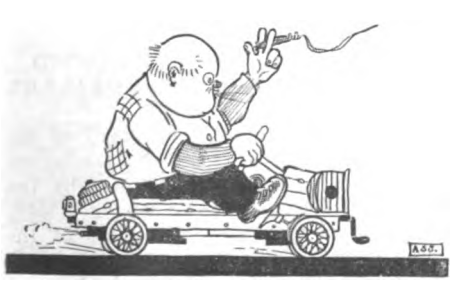
"German machine guns well entrenched made an attack by infantry impossible. Soon up the road came 10 little Fords, each mounting one or two machine guns. They passed right through the Germans spouting streams of bullets on either side. The Germans retreated and the operation was completely successful, only two cars failing to come back. The outfit was at once christened 'Ford's Cavalry." This news dispatch from overseas discloses the fact apparently that the small tanks which are being made in this country are making a name that will live long in the annals of achievement with their larger brothers which stampeded the Germans also, and will add more laurels to the crown of wreaths that must be conceded to the motor car industry for its performance in the complete obliteration of the Hun.

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In these days of high gasoline prices and high prices for everything, including automobiles, why not make your own car. It's not such a tough job, Bill Powell of Chicago, Ill., says, and he has a "self-made" car to back his statement that any man with two hands and a head can turn out a "bus" that makes up in efficiency what it lacks in size.

Bill wrote to the Remy Electric Co. of Detroit and Anderson, Ind., about his baby motor car a few days ago, saying that he has used a motorcycle engine and a Remy generator for ignition and lighting.

The power plant is a two-cylinder, 11 horsepower engine, and the wire wheels



are fitted with airplane tires, which Bill says "make it pretty soft." As the car is extremely light, Powell avers that "the gasoline consumption is unusually low."

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During the races at Readville, Mass., several weeks ago, W. J. McDonald, a real estate dealer of Boston, created quite a furore when he drove down in the stretch in front of the grandstand with a full blooded black Shetland pony in the tonneau of his car. The pony, which was donated by Mr. McDonald to the Red Cross fund, was auctioned off and brought $1750. The pony exhibited unusual spirit and activity during his ride and the sale and did not seem to feel the insulting glances of the race horses, who seemed to feel that it was adding insult to injury to parade one of their kind about in an automobile after seeing thousands of spectators arrive in

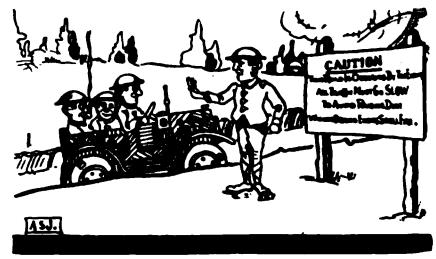


the very same machines that were usurping their place in civilization.

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Many of the younger element who were wont to speed to their hearts content in this country and let father pay the fines are now on the other side driving cars in the various departments of the war service. While many occasions probably arise over there calling for a speed that is in keeping with their ideas of locomotion and they are given an opportunity to go into high and open the throttle, but the majority have also learned of traffic rules that cannot be violated, as if they are, the consequences are quite often death. On the roads in the immediate theater of active operations one quite often runs across a sign reading: "Caution—This Road Observed by the Enemy. All Traffic Must Go Slow to Avoid Raising Dust, Which Draws Enemy Shell Fire."

It is needless to state that these instructions are scrupulously observed and receive more respect than the conventional signs found along our roadways to the effect that the speed limit is so many miles per hour.

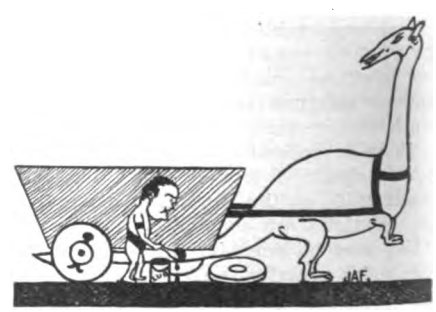


Although the necessity of lubrication to eliminate friction probably originated with the cave men when they hitched the first dinosaurus to their crude carts and has been recognized down through all the ages as a means of preventing wear on moving parts in contact, many motorists fail to give their cars proper attention in this respect.

Some motorists wonder why, with the smooth, finely ground bearings with which automobiles are equipped nowadays, it is necessary to use a lubricant. A strong magnifying glass held against the surface of a bearing, especially a new one, will reveal the answer—myriads of minute depressions and protrusions cover the metal surface of the bearing. It is obvious that something is required to fill up this roughness to present a perfectly smooth contact surface. Hence a lubricant is used.

Ordinary greases or oils are not sufficient, as they soon squeeze out when the bearing becomes warm. Garage men and automobile mechanics recommend a lubricant containing a flake graphite, as it is the only substance that will adequately fill the uneven surface and stick there despite the rubbing and the heat. In fact the harder it is rubbed the smoother it becomes.

If a car were to be run without a lubricant in the bearings it would screech fiendishly. Plain grease or oil stops the screech, but they both squeeze out under pressure, friction sets in and the bearing eventually wears out. The Joseph Dixon Crucible Co. worked on this principle when they brought out their graphite automobile lubricants. The Dixon com-



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pany has developed the science of lubricating and now puts out a graphite lubricant for every purpose and place on the car.

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The speed maniacs have tried the patience of the public, caused exasperation among the authorities in charge of enforcing the law and brought opprobrium upon their heads from the pens of the editors, but no such drastic recommendation for eliminating this class of nuisance has come to light, as has been suggested by a writer in the Woburn



Times (Mass.). Whether or not this gentleman was ever struck by one of the speeders is not known, but if his experience with them were to be judged from the vindictiveness of his idea as to how they should be treated, he not only must have been hit, but rolled over a number of times, as he suggests that "speeders should be jailed without bail. It is just such men as these that should be dragged into court at the noose end of a rope attached to the police car and then given a chance to break rock for a few years."

Of course such harsh treatment for the speeder is really out of the question, but sometimes it seems that it would be justified punishment, as these maniacs know it is against public policy, the law and their own interest, yet they persist in the evil practise. But then it must be remembered that speed maniacs are necessarily irresponsible people, and as such, a pace of 50 to 80 miles an hour, if necessary to gratify their mania, would be pursued even in the face of a possible penalty of a little thing like $100 fine or a few days in jail.

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While it is a generally recognized rule that the motorist should sound his horn or signal on approaching an intersection of highways, yet it appears that many do not take this precaution unless they see other vehicles approaching. This rule is a law also in many states and while seldom enforced should nevertheless be respected, as neglect to do so



will only bring the rule into prominence with the result that it will be as vigorcusly prosecuted as the laws against speeding. Our attention has been called to an incident which serves to show how general the negligence has been in this respect. At a summer watering place last month the police chief was instructed to apprehend and bring before the court all motorists who failed to sound their horns at intersecting streets. As a result of the campaign 51 auto drivers, nearly all summer tourists, were before the court in one day. These drivers hailed from 50 different towns and a dozen different states, showing that this practise of taking a chance is not peculiar to any particular locality.

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Many slackers who have been driving their machines about for pleasure on gasolineless Sundays were unmolested and spun onward unconscious of the breach of faith they were committing, but others were not so fortunate. Many motorists who in violating the law landed in court found that the judges were disposed to treat their offenses with less leniency than under ordinary circumstances, while others found themselves the object of jeering, abusive mobs. One man who found himself in the center of a thriving Massachusetts city, with his gasoline tank empty, and could proceed no further, suddenly found himself in the center of a gathering that vent its feelings upon him in such a manner that if he lives to be many moons, he could never commit all the crimes he was charged with. His wrath, which was aroused at this abuse, was soon dis-



pelled, however, as a matter of policy, as his retaliation to the epithets only served to draw a bigger crowd and encourage those who were already harangueing him. It was suggested to him that his only course out of the predicament was to return to his garage, a suggestion with which he complied after some one had agreed to procure the gasoline necessary to make the journey.

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The first motor truck mail and parcel post delivery between western Pennsylvania cities will be started within the next few days between Pittsburgh and McConnellsburg. The route will be over the Lincoln Highway and will cover a total distance of 126 miles. Two three-ton motor trucks will be used.

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While one would generally suppose that since the advent of the automobile there are few places that boasted of even a few inhabitants that had not been visited by a motor car, yet it seems that within a two days ride of one of our largest cities there are communities that are as startled at the sight of a car as the farmer was upon first viewing the giraffe, he vouchsafing that they couldn't fool him, because there weren't no such animal. Such was the experience, however, of Mr. and Mrs. Belden of Canton, O., when they went on a trip in their new Franklin car to inspect some mining property in the Ozark mountains of Missouri and Arkansas. They state that it seemed as though they were lost every other mile on the route and that when arriving in several small mountain towns the people were startled upon seeing their car and gathered about it as though it were a curiosity. The people stated that it was the only big car they had ever seen.

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The Lincoln Highway is the route of first interest in the exposition of modern traffic as indicated by recent events upon the Pennsylvania section. The passage of huge trains of heavily laden motor trucks, hurrying supplies to east-



ern ports for shipment to the troops in France, is a matter of daily record at practically each stop upon the highway across the state.

Motor ambulance units are also noted upon the road bound for the same destination. Vast amounts of commercial freight are transported over this route by motor vehicles operated by private enterprise. The traffic is constantly growing in volume and variety of character.

Not only upon the Lincoln Highway proper but in the air above are signs of the future movements of transportation. Airplanes are frequently noted following the general line of the highway in extended cross-country flights.

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Miss Helen L. Roberts, St. Louis, Mo., is probably the first traveling sales representative in the accessory jobbing trade and has already proven her ability in this line. She took the place made vacant on the sales force of a large dealer in St. Louis when a salesman joined the colors for service overseas, and immediately displayed exceptional sales ability.

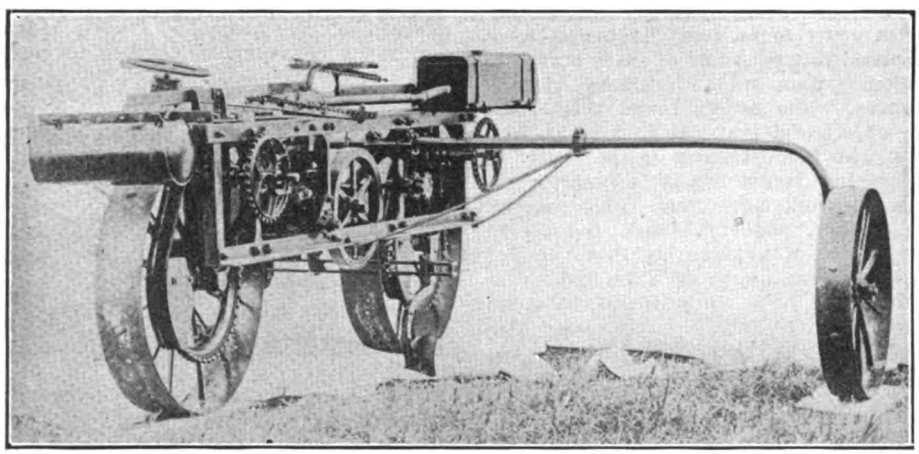


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Power Farming Implement Guides By Hand Or Operates Automatically

By Frank C. Perkins.

CONSTRUCTED to principles that are alike revolutionary of farm operating and agricultural implement design and use, the Synmotor, a power machine developed at Laurel Spring, N. J., is seemingly the pioneer of what has considerable promise of becoming automatic farm cultivation. The machine has been built with the very practical idea of use with and without



The Synmotor, an Automatic Power Implement That Is Designed to Operate in Circles, Controlled by a Wire Attached to a Center Post.

operators. The first produced have been found extremely serviceable and useful. While what has been turned out thus far has been in one sense experimental, the results have been sufficiently satisfactory to justify the belief that they can be, in different sizes and capacity, do work very thoroughly, with mechanical precision when operated automatically, and when operated by an attendant they will be equal to other types of power implements.

The Synmotor may be steered by hand for plowing and cultivating straight rows, and with an automatic steering device it will do either work, day or night, without an operator. The claim is made that besides being an exceptionally good implement for hand steering, for plowing and cultivating field crops planted in straight rows, it can be used for other work for which power implements are not practical. For instance, it can be used to break crust and cultivate between drills of vegetable seed or grain after seeding and before the plants have grown above the surface of the ground and are visible. Statement is made that many crops germinate poorly because of a hard crust and lack of moisture and are frequently lost.

Synmotor a Three-Wheel Implement.

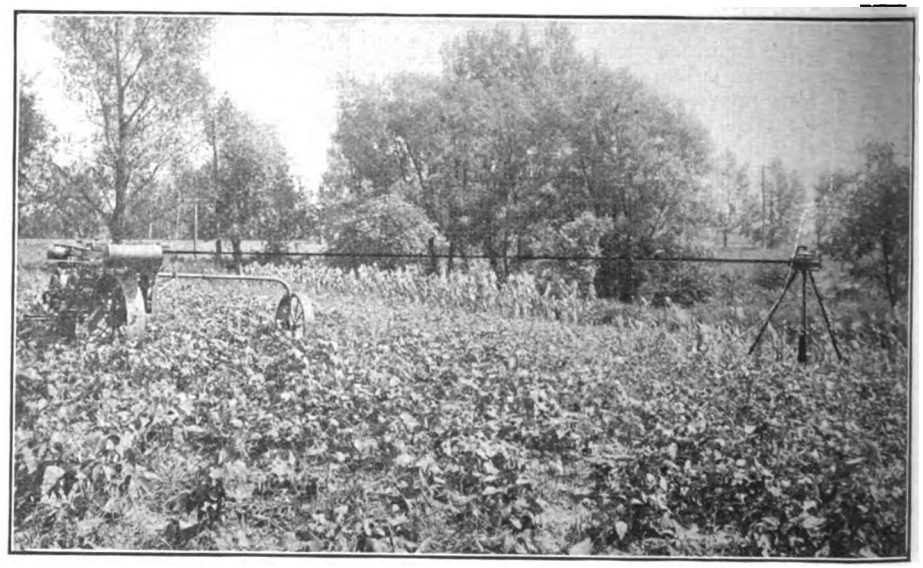
The Synmotor in general appearance resembles a large motorcycle, having a frame with a wheel at either end, in which is mounted the engine and the driving mechanism, and at right angle to this frame is an adjustable out-rigger, at the end of which is mounted a third wheel. The wheels are all metal and have wide rims, those in the main frame having cleats or spuds in the rims that afford traction. When hand operated the Synmotor can be turned in very small radius and because of the out-rigger construction it can "straddle" rows of plants.

When operated automatically it is driven with the out-rigger wheel inside nearest to an operating post that can be located wherever desired. This post, which is shown in an accompanying illustration, is guyed with ropes or cable so it cannot sway. At the top of this post is a drum four feet in circumference, just the width of the swath covered by the machine. From this drum a slender steel wire runs out through a guide pulley on a revolving arm to the steering lever on the cultivator—whether it is near or at the far side of the field. The wire fully controls the machine, even if it is started several hundred feet away from the post.

Operates Around the Center Post.

The Synmotor is started and moves in a circle around the post, gradually winding the wire around the drum. In other words, with each full circle around the post the wire is wound once around this drum, and this movement guides the machine the width of one swath nearer the post. Being perfectly tempered the wire cannot stretch and an electro-coated surface protects it from rust. The total weight of the wire is less than two pounds. Over 600 pounds pull would be needed to break it. It winds upon the drum absolutely the same each full circle of the Synmotor. Hence it establishes the location of the machine in any part of the field unfailingly. The wire winds on the face of drum without kinking. When the implement has run as near the post as is practically possible to operate it, the drum is unlocked, the machine moved out of the field, the operator steering it by the hand wheel, the wire unwinding as it moves from the drum.

The four-foot swath may cover several rows. If four rows, consider that if singly cultivated each row would have to be gone over separately, requiring four men, or one man four times to do the same work. Claim is made that the Synmotor does its work much more thoroughly than any hand machine, that it is absolutely accurate and follows its course with no perceptible deviation; that it does not unearth small plants and can be worked much closer to the rows; that further, one can plant rows as close as the plants can be practically grown



The Synmotor and the Control Post Set Up in a Field, the Wire Connecting Them Being Accentuated to Show the General Manner of Operation.

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and then cultivate them as perfectly as if the rows were three feet apart.

Works Without Lighting.

The inventor of the Synmotor maintains that cultivation with it can preserve moisture and kill weeds from seeding time onward; that it can be operated at night without an operator during rush work, or when the ground is just right for plowing. One of the illustrations shows the accurate automatic steering of the Synmotor. A 7¼-acre patch of cow peas and sorghum was seeded in drills by this machine and the growing plants cultivated, with only occasional inspection by the attendant during numerous nine-hour runs, some of which were completed after nightfall.



Corn Planted in Contracting Circular Rows, Cultivated with a Synmotor—Note the Accuracy of the Worked Ground Between the Continuous Hills.

Automatic Work Is Accurate.

The accuracy of automatic steering is remarkable. It has been certified to by many persons who have watched the machine in operation at Lawnside, Camden County, N. J. During many runs the space between the cutting steels and the drills of plants did not vary a half inch. Thus the implement proves its right to its name—Synmotor. Plants grown in closely spaced drills, such as onions and radishes, are not too difficult for cultivation, even in large acreage. It covers fields of growing plants with the speed of a two-horse cultivator and with the accuracy of a garden wheel hoe. It has driven through open furrows, chuck holes and sand filling, proving that the tractor and the steering wire will endure regular farm work.

With disc cultivator steels, disc scuffles and seeder points the Synmotor can be run all day and not gather trash. With spring shanks the steels cut clean over uneven ground and clay spots. The Bessemer engine burns kerosene fuel. It is started on gasoline and when hot is switched to kerosene. This is important because of the permanent increase in the price of gasoline.

Larger Machines for Plantations.

In later designs some of the improvements to be added are hardened roller ball pinions and drive chains and a compact six-horsepower engine. This will give more room under the tractor for attachments and a lower tractor for orchard discing. An 1800-pound Synmotor has been developed to cover a seven-foot swath, for grain growers and for southern plantation work. It is designed to be worked on 10-acre areas, the operations being such that alfalfa or other permanent crops can be grown in the space between the cultivated areas. Both the light and heavy machines have rear hitches for attaching standard makes of implements, such as potato planters, plant setting machines, seeders and orchard discs.

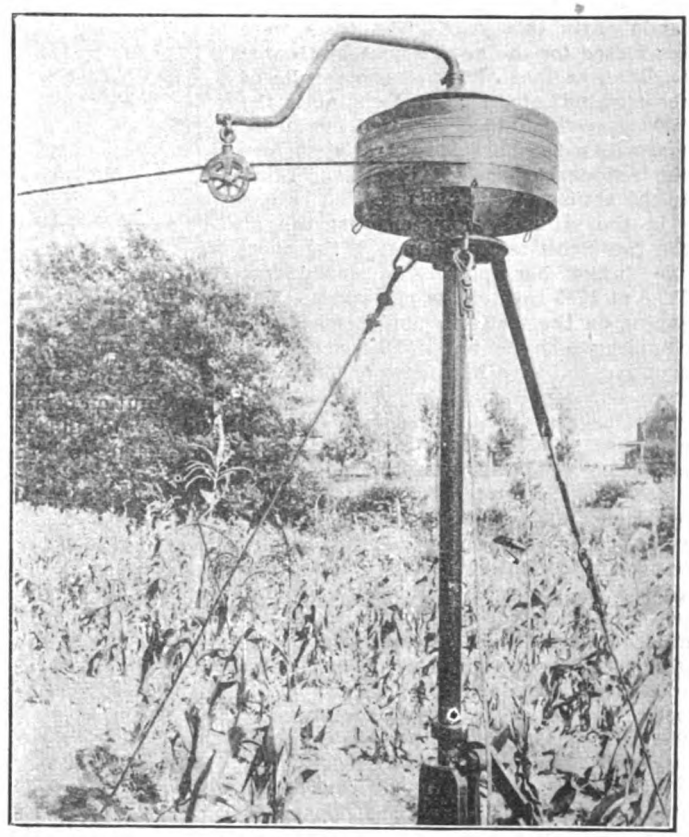
It is claimed that this implement is especially suited for operation by men not able to do hard all day work, and that it will be extremely useful on southern plantations where the intense heat lessens the work of man and beast.

Circular Cultivation Is New.

The Synmotor method of automatic cultivation in circular rows is absolutely a new idea with market gardeners and vegetable growers. To this machine may be attached any tools required for cultivating, hoeing and hilling. The circular method of planting is new and is claimed to be of special value on intensively operated farms, where every square foot of land must pay a profit.

The device that controls the automatic operation of the Synmotor is very interesting mechanically. This consists of a piston and a heavy helical spring operating in an oil filled cylinder, which is coupled to the rear end of the steering lever, and this maintains an even tension on the wire that is attached to the forward end of the lever and wound on the drum in the center of the circle that is worked. The piston cannot be obstructed and its action is positive.

The Synmotor is claimed to do its work for very small cost. For average cultivation the consumption of fuel is about a half gallon an acre and with reasonable care the expense of upkeep and maintenance will be relatively low. When driven by hand plowing can be done to a depth of 6½ inches with a single Syracuse No. 51 plow, and that it will do good work in sod or stubble, or in heavy loam land, after rain has softened it, and where the ascending grades are not more than eight feet in 100. The plow is attached to the gang bar and the equipment becomes a riding plow with an automatic lift. A disc coulter or marker is attached to the left end of the gang bar and marks a line by which to steer for the next furrow.



Center Control Post Showing the Stationary Drum Partly Wound with Wire and the Swinging Arm and Guide Pulley.

With this equipment short turns can be made at head lands, the same as with horses, for the plow can be lifted after the first quarter turn and dropped before the second quarter turn is made, so that head lands can be worked to within six feet of a fence or wall. The out-rigger is adjustable to six feet, and the gang bar may be extended at the left side for straddle row cultivation.

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New Hall-Scott Six Cylinder Aviation Engine Develops Over 200 Horsepower

Final Test Also Given To Twelve Cylinder Model

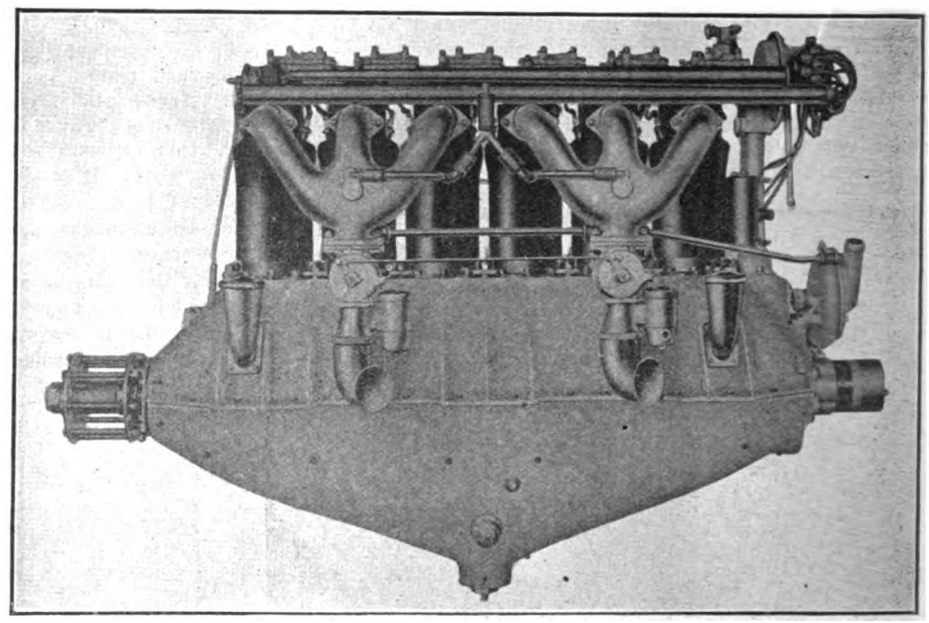
Continued progress in the design and construction of American airplane engines is indicated by the recent block tests of the new six-cylinder, 200 horsepower "L6" type of Hall-Scott engine, conducted by the U. S. government inspectors late this summer.

Announcements of this new airplane engine manufactured by this pioneer firm of airplane engine builders were made early this year. The tests were conducted for the government by George R. Ross, as inspector, and the results of the test indicated that this engine is the lightest weight, high powered engine of more than 200 horsepower rating before the aeronautical world today according to the claims of the makers.

In the six-hour, non-stop, test run at the Hall-Scott factory June 22, the average brake horsepower developed was 212.6 at 1666 revolutions per minute. The engine on the testing stand weighed 502 pounds, which is the equivalent of 2.36 pounds per brake horsepower. The tests were witnessed and approved by U. S. Inspector Ross, acting for the Navy Department, which department was the purchaser of this engine.

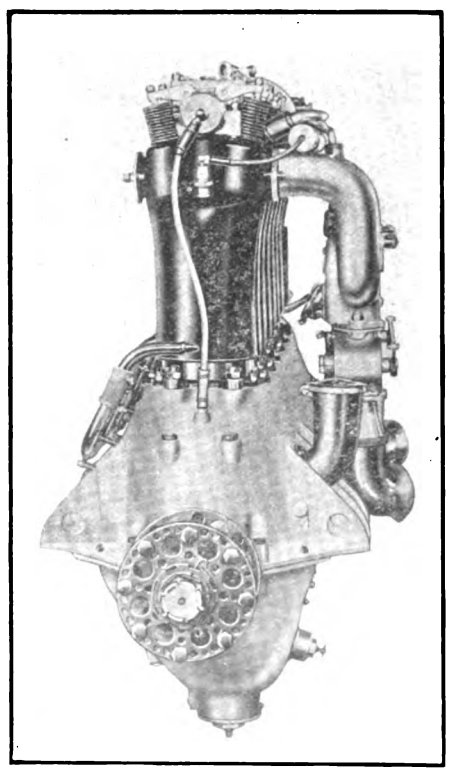
Some of the interesting points of comparison pointing to the fact that this engine is a great improvement over the best previous Hall-Scott six-cylinder type are to be noted. Certain fundamental features in the design consisting of refinements of the reciprocating parts, proper understanding of thermal and volumetric efficiencies, lubrication questions and more effective compression pressures has permitted a great increase in revolutions per minute. Greater flexibility also is noticeable, tending to a lowering of the torque and smoother running. Refinement of design has permitted the retaining of all oil in the engine, increasing the economy to such an extent on oil consumption that the amount used per brake horsepower hour is only 0.01 pounds, while in the best previous engine the oil consumption averaged .35 pounds per brake horsepower hours.

The elimination by careful analysis of all surplus metal on all the constituent elements entering in the construction of the engine has reduced the total weight of this engine to 502 pounds, which, contrasted with the A-5a type of engine, which weighed 595 pounds with lower horsepower development, makes the comparison of weight per brake horsepower very noticeable. The A-5a type weighed 3.75 pounds per brake horsepower. Much of this reduction in weight



Hall-Scott Airplane Engine, Model L-6, Intake Side: This Aviation Engine Has Six of the New Interchangeable Liberty Engine Type Pressed Steel Cylinders of 5x7 Inch Bore and Stroke. At a Recent Government Test It Developed 212.6 Horsepower at 1666 Revolutions Per Minute at West Berkeley, Cal., Plant of the Hall-Scott Motor Car Co.

was of course made possible through the substitution of steel cylinders (which are similar to the Liberty engine type, as perfected for the government's great airplane engine), for the cast iron cylinders previously used.



The Propeller End Showing Hub That Is a Development Based on 10 Years Experience in the Design and Building of Aviation Engines.

Due to the increased strength of the steel cylinders it is possible to have higher compression pressure and higher thermal temperatures, which is conductive to greater over all efficiency. Considering the greater volumetric efficiency of this engine the fuel consumption compares very favorably with that of the previous types. Measurements made show consumption of .55 pounds per horsepower hour, which is no greater than that in the older type engines.

Incorporating many of the attractive features of the well designed six-cylinder types of Hall-Scott engines, together with the addition of a number of special features exclusive with its own type, the new A-8 Hall-Scott 12-cylinder airplane engine, just being given its final testing at the West Berkeley, Cal., plant of the Hall-Scott Motor Car Co., marks a decided advance in the design, construction and production possibilities of American airplane engines.

The A-8 type Hall-Scott engine is the lightest weight, high powered engine yet developed in America, with a horsepower rating in excess of 450 and a weight of less than 900 pounds. In fact the first block tests at the Hall-Scott plant, late in July, had to be stopped after the engine was placed on the stand. gradually warmed up and run, because it was evident that the power developed was too great for the testing stand. A special one is being built, and a dynamometer of 600 horsepower rating has been sent for, on which the final test will be

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completed. The engine is fitted with a four-blade propeller.

Its 12 cylinders are 5x7-inch bore and stroke, and are of the pressed steel jacketed type, similar to those which are used in the construction of the Liberty engine. Standardized gears are used throughout, and with the cylinders are made interchangeable with four, six and eight-cylinder engines of the A-5, A-7 and L-6a types of Hall-Scott motors.

As a matter of historical interest, this A-8, 12-cylinder Hall-Scott engine was completed and ready for its preliminary running tests May 1, 1917, and had been placed on the testing block when Col. E. J. Hall, now of the aviation service, United States Army, its designer, was called to Washington to assist the government aircraft production board in the designing of an American airplane engine that would meet the requirements of war time service in dependability of functioning, reduced weight and greater power than any then on the market. Every one who has followed the government's aircraft program knows of the result of Col. Hall's work in Washington and the recognition officially accorded Hall-Scott principles in the authorized war department statement concerning the Liberty engine.

JAMES L. WHITE OF COLE MOTOR CAR CO. VICTIM OF INFLUENZA.

James L. White, assistant general manager of the Cole Motor Car Co., died at his home in Toledo, O., on Oct. 10 of Spanish influenza, which he contracted in Washington while on a visit there regarding some war work that the Cole company was to undertake for the government.

He had been associated with the Cole organization for many years, coming to the company from the Northway Motor and Manufacturing Co. of Detroit. He acted as purchasing agency for the company for some time and about a year ago was appointed assistant general manager and had charge of all production activities at the Toledo plant.

H. L. HALL MANAGES CHICAGO BRANCH OF SWINEHART CO.

H. L. Hall has been appointed manager of the Chicago branch of the Swinehart Tire and Rubber Co., 1328 Michigan avenue, which handles the central western territory.

For the past eight years Mr. Hall has had charge of the western territory for the Troy Carriage Sunshade Co. of Troy, O., manufacturers of windshields and other automobile specialties.

ALBERT W. RUSSEL APPOINTED TO THE WAR CREDITS BOARD.

Albert W. Russel, formerly president of the Russel Motor Axle Co and treasurer of the Russel Wheel and Foundry Co. of Detroit, has been appointed a member of the War Credits Board by the acting secretary of war, Benedict Crowell. He fills the vacancy created by the resignation of F. P. Neal.

Over Half Million Cars Now In Use In European Countries

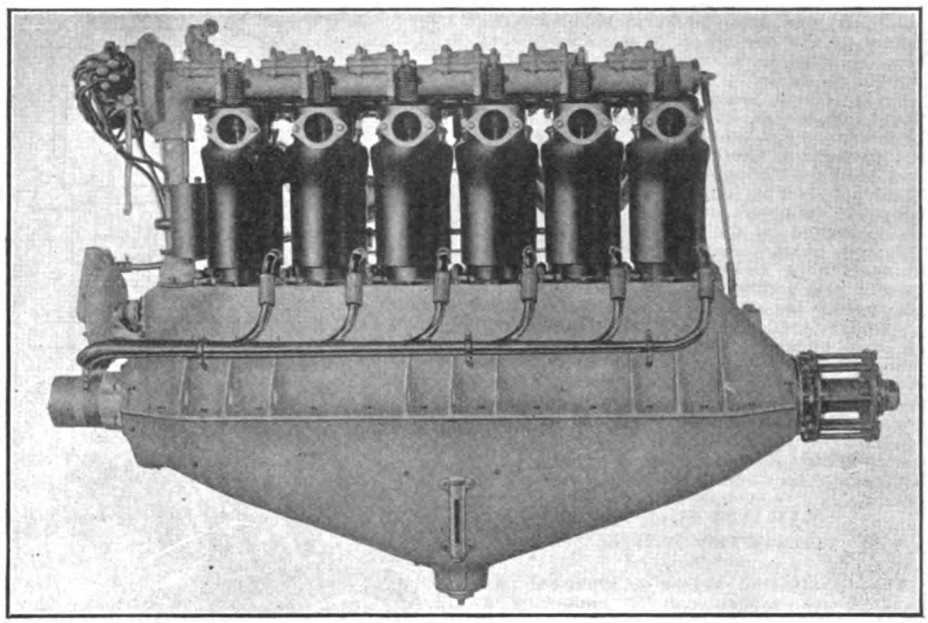
What are probably the first accurate figures compiled since the war started in 1914, showing the number of automobiles in Europe, have been issued by the Fiat Press Bureau of Italy. These statistics place the total number of motor cars in Europe as 522,112, although they are not compiled from very recent reports, as owing to the war conditions it has been impossible to get accurate returns from several countries later than 1916, and the number included for Germany, 95,000, is the number in use in that country in 1914.

The returns are for passenger cars only in most instances and do not comprise lorries and motorcycles. England's returns are lower for 1917 than they were for 1914. Yet England has added considerably to her number of commercial motors by reason of the war.

The French returns are based on actual taxes paid and not including taxicabs, lorries or motorcycles. Before the war the actual number of privately owned motor vehicles in France was about 115,000. Since then it is estimated that France has imported or built 80,000 war motors.

The statistics for the principal countries, with the year they represent and the proportion of cars to inhabitants are:

Country	Cars	Population Year	Per Car
Great Britain	171,607	1917	268
France	98,400	1916	402
Germany	95,000	1914	684
Italy	35,500	1918	1,002
Russia	27,900	1916	531
Austria-Hungary	19,360	1916	2,671
Belgium	14,700	1916	515
Spain	10,253	1918	1,989
Holland	10,000	1917	658
Sweden	9,000	1916	620
Denmark	8,500	1917	343
Switzerland	6,157	1914	611
Portugal	3,211	1917	1,692
Norway	3,067	1918	730
Bulgaria	3,050	1916	1,419
Roumania	2,500	1913	2,899
Finland	2,000	1917	1,800



Hall-Scott Airplane Engine, Model L-6, Exhaust Side: Its Weight Is 502 Pounds with Cast Steel Cylinders, or 2.45 Pounds Per Horsepower. Equipment with the New Interchangeable Pressed Steel Cylinders of the Liberty Type Reduces This Weight Considerably.

JENKINS VULCAN SPRING HAS ATTRACTIVE SERVICE PROPOSITION.

The Jenkins Vulcan Spring Co., Richmond, Ind., makers and distributors of Vulcan springs, have built up an exceedingly satisfactory service for dealers and car owners with their product and in addition to the strong advertising support they furnish dealers in a number of ways with practical helps in displaying and selling their springs. The Vulcan display rack, which is sent free with an assortment of springs, enables the dealer to display the stock in an attractive manner and also offers the customer a convenient means of examining and selecting the spring he wants.

ELKHART AUTOMOBILE CO.

A petition has been filed asking that the Crow-Elkhart Automobile Co. of Indiana and Arizona be declared bankrupt and a receiver be appointed. The petition was filed in the Federal Court at Indianapolis by the Charles Monger Co. and the Isbell Lumber and Coal Co. and Ora Neff of Lockport. Judge Harmon of the Elkhart Superior Court has appointed M. U. Demarest receiver.

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Mechanical Helps and Information Submitted by Readers and Suggested by Our Mechanical Department In Answer to Queries. Time and Money Saving Methods and Devices Which Can Be Used by the Amateur with Practical Results.

RAISING THE CAR.
(Figure 524.)

Repair men often place jacks under the frame of the car when it is necessary to remove the rear assembly, a practise which requires blocking of the front wheels. Care must also be taken that the body is not touched, as very slight pressure would cause the car to fall off the jacks. A simpler method of raising and holding the rear of the car steady is illustrated. This suggestion can only be adopted, however, when there is a chain fall attached to the ceiling of the room. The top of the car is lowered and the tonneau floor board removed. Next cut from a plank four inches wide and about 2½ inches deep a length that will tightly wedge into the channel steel frame of the chassis. The board should be rounded at the edges as shown at A, so that it can be driven with a hammer into the frame. A sling can then be placed around the board and then placed in the hook of the chain fall. The advantage of this method is that it is impossible for the car to be pushed over.

EXHAUST HEATER.
(Figure 523.)

The illustration shows a practical exhaust heater which can be made in a short time by anyone having a pipe threading tool. The exhaust pipe is cut at a point between the exhaust and the muffler and a pipe T is screwed to it. Two pipes are screwed to the T, one going up through the floor of the car to an elbow, "X," into which is screwed a short length of piping, which forms the heater. The other connects with a second T. From the second elbow on the heater a pipe is run to the second T, which is connected with the muffler by another pipe. It is desirable to have the Ts in line so as to form a straight exhaust line from manifold to muffler.

The size of the heater pipe itself may be varied by using reducing elbows, as at "X" and "Y." If it is found that the device furnishes too much heat, it may be covered with asbestos and painted to match the finish of the car.

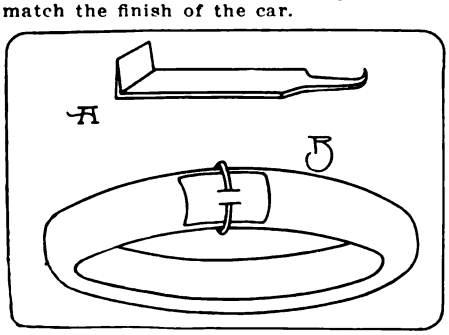


Fig. 527.

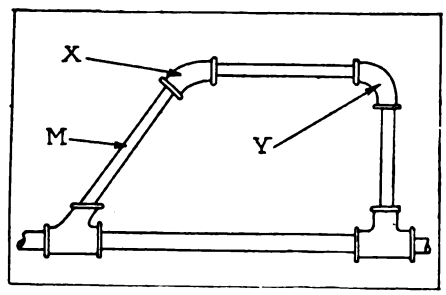


Fig. 523—Exhaust Heater.

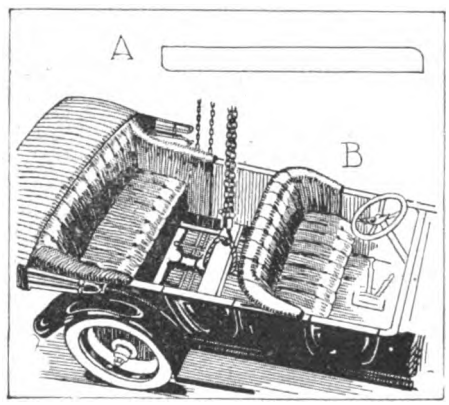


Fig. 524—A Practical Means of Raising the Car When a Chain Fall Is Available.

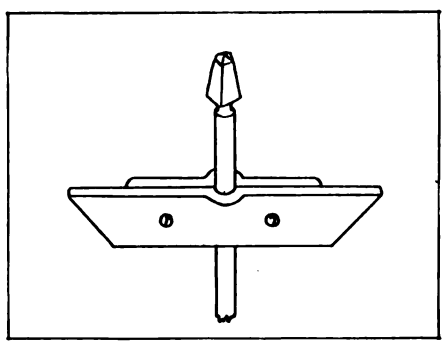


Fig. 525—Valve Reseater.

REPLACING SMALL SCREWS.
(Figure 526.)

An old steel pen has its use in repair work, especially when replacing small screws in speedometers, magnetos, electric horns, etc. These screws are generally too small to be held in the fingers, in which case slip a screw into the slit or hole of the pen, which should be held in a penholder. In this way it is easy to start the screw.

VALVE RESEATER.
(Figure 525.)

By constant regrinding the valve seats often become so worn and grooved that the valves seat so deeply as to permit only a small opening and a consequent loss of power. When this is the condition the valves should be replaced by larger ones and the valve seats recut to a larger diameter. The illustration shows an easily constructed valve reseating device. The cutter blade is made from a flat piece of tool steel, fitted with a strap for holding it to an old twist drill, and with its edges cut to an angle of 45 degrees. The shank of the drill should be left long enough so as to extend down through the valve guides, and large enough to fit and form a center for the cutting tool.

HOME-MADE SCREW DRIVER.
(Figure 527A.)

For the removal of some of the larger sizes of machine screws the ordinary screw driver is often found inadequate, it being impossible to apply sufficient grip to its handle to turn the screw. While the turning effort may be increased by applying a small wrench, or pliers, to the blade, an offset screw driver is a much handier tool, combining function of lever with that of screw driver.

Such a tool is also useful in dealing with screw heads in such close proximity to other parts as not to admit the length of the ordinary screw driver. One can easily be made from an old file, heating the end to a dull red and bending it at right angles to the length. The edge is then ground off to a thickness suitable for size of screw for which it is to be used.

PROTECTING TIRES.
(Figure 527B.)

Many owners fasten their spare tires to the side or back of the car with common skate straps. This practise is objectionable, for when they are held in this manner for any length of time the strap wears the rubber from the tire. A simple and practical remedy for this is illustrated in the sketch. Two slots should be cut in a piece of leather, measuring about four by six inches, and strap threaded through the slots as shown.

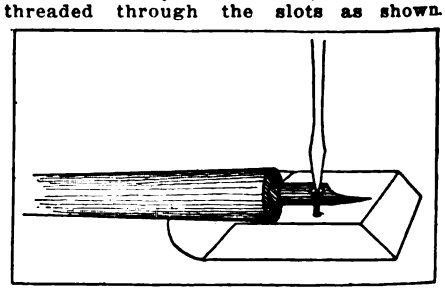


Fig. 526.

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LOCATING COTTER PIN HOLES.
(Figure 528.)

In removing a nut held by the cotter pin one is invariably so intent in getting the nut off that the location of cotter pin hole is seldom noticed. In fact, it is doubtful if this is ever thought of by the average layman, until such a time as it is desired to put it back when the nut is again in place. A simple way to make sure of the location of the hole is to mark the end of the shaft by means of two notches cut in the edge with a cold chisel in the same plane as the hole or by a straight line cut on the end with a cold chisel. See sketch. When putting on the nut it can be screwed up tightly until the castellated openings in it line up with the marks on the edge of the bolt, at which time the cotter pin can be easily inserted.

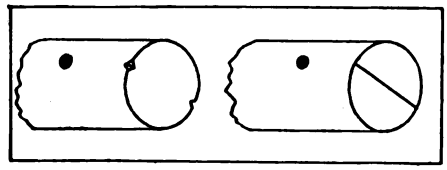


Fig. 528—Locating Cotter Pin Holes.

TESTING CONNECTING RODS.
(Figure 530.)

In installing new bearings in the connecting rods it is important to know that these are correctly placed in relation to the rod itself and the side of the piston. A jig for ascertaining this, similar to one used by one of the large motor makers, consists of a substantial stand, A, mounted on a bench or table, mounting a vertical shaft, B. To the upper end of this shaft is securely fixed a smooth and accurate face plate, A. Near the lower end is a short projecting shaft, D, of the exact diameter of the bearing of the crankshaft. Also the axis is exactly at right angles to the surface of the face plate. The distance between the parts C and D corresponds with that between the piston and the connecting rod bearing.

The piston and rod assembly is used complete. The bearing is clamped on the shaft, D, as it would be onto the crankshaft, and so that when rocked back and forth the piston just touches all or partly on the face plate, C. If the contact is perfect, the alignment of the bearings is considered to be correct. If the piston bears on the face plate on only one edge the alignment should be remedied. In some cases this, while not to be generally recommended, may be done by placing the rod in a vise and bending slightly through a long leverage until the alignment by trial becomes satisfactory. Of course the proper way, theoretically, is to have the bearings scraped in.

PUTTING FLANGE ON TUBING.
(Figure 529.)

A simple way to make a flange or rolled edge on copper tubing when installing a new gasoline line is as follows: Mark a center line on a block of hard wood and along the line bore three or four holes of sizes corresponding to the outside diameters of the most common sizes of tubing. Then saw the block longitudinally in two sections through the exact center of the holes. Place the tube in its proper hole in the two sections and clamp in a vise, allowing the tube to extend one-quarter inch above the surface of the block. The flange or roll can be made by driving in a round nose punch of suitable size placed in the top opening, as shown.

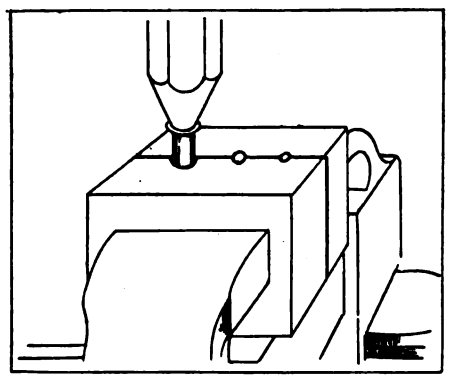


Fig. 529—Flanging a Tube.

CHAIN DRAWER.
(Figure 531.)

There are few tasks more exasperating than trying to join the two ends of a tight chain. At times one needs several hands to hold each end, line up the holes and insert the pin at the same time. It is especially awkward when chains are in places not conveniently accessible. A handy little device which may be easily made to do this work is herewith illustrated. From soft steel stock ½ by 1½ inches cut a piece about six inches long. Draw a center line lengthwise along the wide faces. About one-half inch from one end of this center line drill a half inch hole. About 1¼ inches up from this bore a one-quarter inch hole from narrow face to narrow face and about 3¾ inches further up bore another one-quarter inch hole in a similar manner, being careful to drill true so the holes will be in the center of the narrow faces. Now with a hack saw cut along the center line you have marked. Cut a couple of pieces of one-quarter inch round stock about four inches long. Thread each up to within an inch of one end with some thread for which you can procure wing nuts. Set the unthreaded ends flush in one of the jaws and secure with small pins. The threaded ends put through holes of the other jaws and put washer and wing nut on each. You now have a handy little clamp useful for many purposes. To use this to tighten a chain spread the jaws apart and placing one in each end of the chain, allowing the roller of the latter to seat in the recess of the jaw to prevent slipping. By tightening first the top nut and then the lower one a powerful leverage will be obtained, which will hold the chain in position while same is being securely fastened together. Simply unloosening the wing nuts will allow the clamp to be removed.

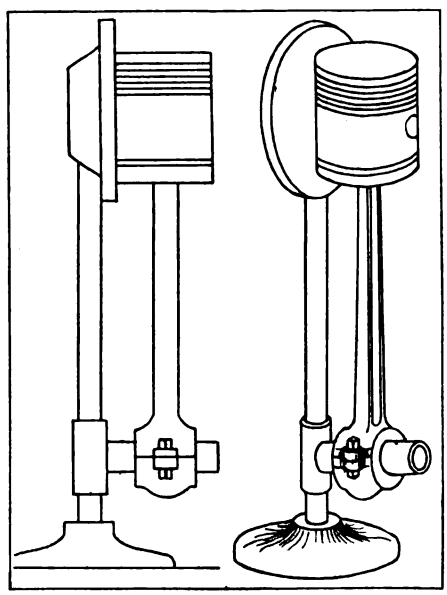


Fig. 530—Aligning Connecting Rods.

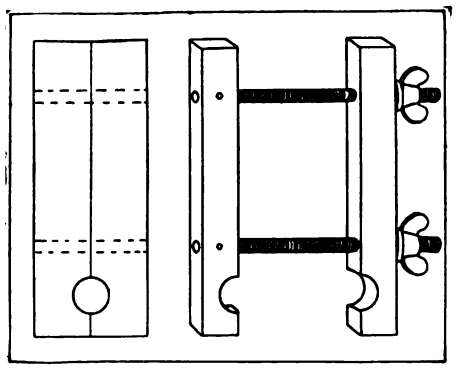


Fig. 531—Device for Drawing Chains.

HANDY TOOL BOX.
(Figure 532.)

A handy box for keeping together, ready for instant use anywhere, the most often used small tools and an assortment of nuts, bolts, washers and cotter pins may be made from a common box of convenient size, preferably with sides about ¾ inch thick. The most satisfactory one will be found to be of oblong shape. This should be divided into four parts by three partitions, as shown in the illustration, the center partition having an opening cut in it for a handle.

Along the sides of this box and placed near the outside upper edges screw a long strip of strap metal having sufficient spring in it to hold its shape if temporarily distorted. The kind used on the revolving rubber stamp stands, but a little heavier, will do. Pick out the few small tools you most often use for quick jobs and bend the strip of metal in shape so that each tool may have a place of its own around the box and may be easily removed by a quick jerk when in a hurry.

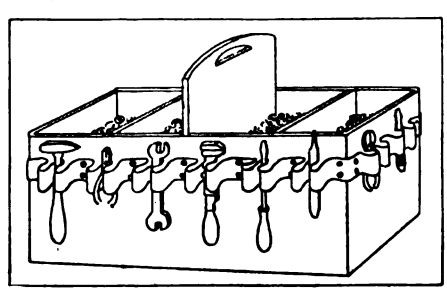


Fig. 532—Handy Garage Tool Box.

CHARGING BATTERIES.
(Figure 537.)

To charge a storage battery it is necessary that a direct current be available. If it is not a device called a rectifier must be used which will transform alternating current into direct current. Having secured the correct current, so to speak, it is next necessary to consider the voltage or pressure of the same. As a common voltage for lighting circuits is 110 volts, the diagram given herewith is on this basis. Before going much further it is necessary to know the polarity of the circuit, or rather, which is the negative (—) and which is the positive (+) wire. A simple way to do this is to mix in a vessel some salt and water in the proportion of about a tablespoonful of salt to a tumbler of water. Taking the wires by the insulation, so as not to get a shock, dip the bare ends into this mixture in the vessel, keeping them at least an inch apart. Immediately fine bubbles of a gas will be seen to be given off one wire. This is the negative (—) wire. Connect up through a resistance (R) made up of carbon filament lamps (use seven 110 volt, 32 candlepower, 100-watt carbon lamps, or 28 110 volt, 25-watt carbon filament lamps), as shown, making sure that the positive wire of the circuit is connected to the positive terminal of the battery. This will probably be found stamped "+," or maybe it will be painted red. Install in the circuit a double pole single throw switch to start and stop the current flow. The battery charge is complete when, with all the cells gasing evenly and freely at the charging finish rate (as given on the battery plate, the gravity of the solution in all the cells shows no further increase during one hour. This is

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determined of course by means of a hydrometer, an instrument which should always be handy where there are batteries to be tested or worked upon. The reading for charged cells should be from 1275 to 1300. By voltmeter the battery should show from six to eight volts when fully charged. Any battery maker will gladly furnish a booklet giving complete diagrams for wiring and instructions for procedure in charging batteries. The diagram herewith is given for what it may be worth to you or other interested readers in lieu of more detailed information.

EFFECT OF WIND RESISTANCE.

(Figure 536.)

Wind resistance while a negligible factor at moderate speeds is very important at high speeds. In fact it has been said that in racing at 100 miles an hour more than 75 per cent. of the power used is to overcome the wind resistance, so you can see that this is really something to be seriously considered. The shape of the car bodies you mention is for a very good purpose and a smooth and properly designed line is a big factor in a car's success. As for the tail piece you speak of this is very important, too, as it must be designed so as to minimize the suction or back pull when the car is traveling fast. On this page is a graphical illustration of the effect of wind pressure or resistance at high speeds, shown in the shape of a curve. Upon examining it will be seen that as the speed of a car is increased the wind resistance is greater in increasing proportion. To find the wind pressure at any speed look up the vertical line representing the speed under consideration and where it intersects the curve draw a horizontal line which by the scale given at the left of the diagram will show the pressure. Regarding the windshields of pleasure cars, the slanting is probably more for the effect of appearance and to deflect the wind from the passengers than it is to decrease wind resistance. By the curve shown you will see that within the speed range of the average pleasure car the wind resistance is not very great.

SANITARY WASH STANDS.

(Figure 534.)

A wash stand equipped with an ordinary well to hold the waste which passes through a garage drain is generally troublesome and unsanitary, it becoming choked with mud and matter so that the waste will no longer flow out. If a bend, as shown in illustration, is installed the annoyance will be overcome. This will draw off the water from below the surface, preventing the solid matter in suspension from getting into the drain, but allowing it to settle at the bottom of the well, from which it can be removed easily. The bend, or elbow, is provided with a cap, D, which allows access to the drain for flushing purposes. As a further convenience a slight depression or valley, A, may be made in the floor just adjacent to the grated cover, C, which sets in the rim cover, B, so that the waste will settle there instead of passing into the well The sediment can be removed periodically

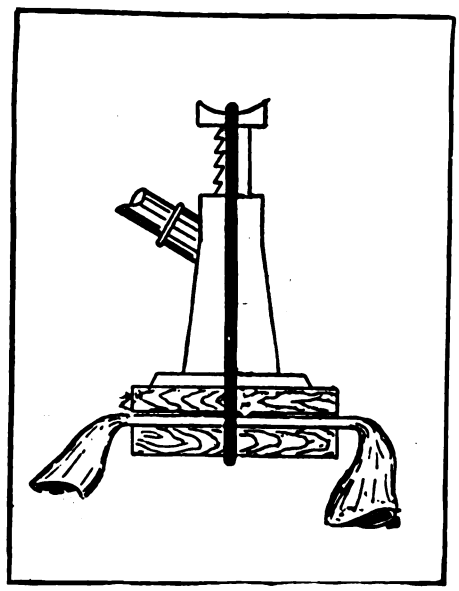


Fig. 533—Emergency Tube Press.

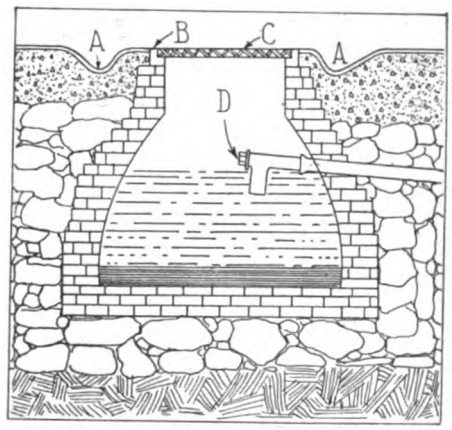


Fig. 534—Sanitary Wash Stands.

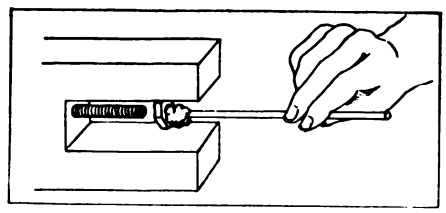


Fig. 535—Chewing Gum in Repair Work.

CHEWING GUM IN REPAIR WORK.

(Figure 535.)

It quite often happens that the amateur repair man is unable to replace a nut on a bolt located in some part of the machine where the designer evidently did not take into consideration the fact that space is required for the fingers or other tools in working on the same. This often results in the loss of one's temper and a waste of much time. Quite often in a place of this kind the nut can be easily put on by sticking it on the end of a stick with a wad of chewing gum and holding it against the bolt, turning it until the thread catches.

EMERGENCY TUBE PRESS.

(Figure 533.)

Any motorist can improvise a tube press for roadside repairs if the following suggestions are heeded: After applying the patch to the tube place it between two blocks, measuring about 4x6x2 inches and mount an ordinary automobile jack upon the topmost block. Bind a strong piece of wire or cord around the blocks and over the head of the jack, as illustrated by the black line in sketch. By raising the jack the wire will be drawn tight and produce the pressure necessary to make the patch adhere firmly to the tube.

LOCATING A LOOSE BEARING.

(Figure 540A.)

It is quite easy to feel for play in connecting rod bearings, when the crank case is open, by moving the rods up and down by hand. To feel for slack in main bearings is more difficult, because of the weight of the parts which have to be moved. In the case of the rear bearing, for instance, it is necessary to move the flywheel up and down, which is beyond the average man's strength. It may easily be done, however, by placing a jack under the wheel. It should be used with some discretion, simply applying enough lifting effort to take up any play in the bearing. This can be felt by placing the fingers of the left hand on the main journal, where it projects from rear bearing.

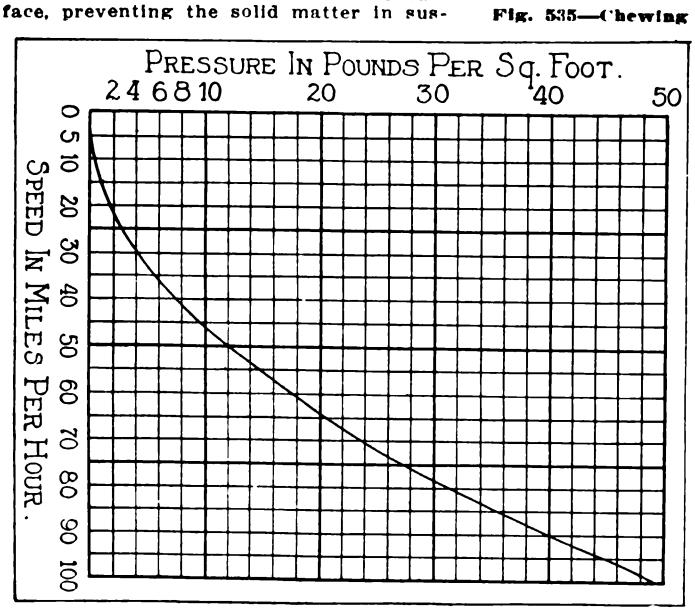


Fig. 536—Showing Wind Resistance at Varying Speeds.

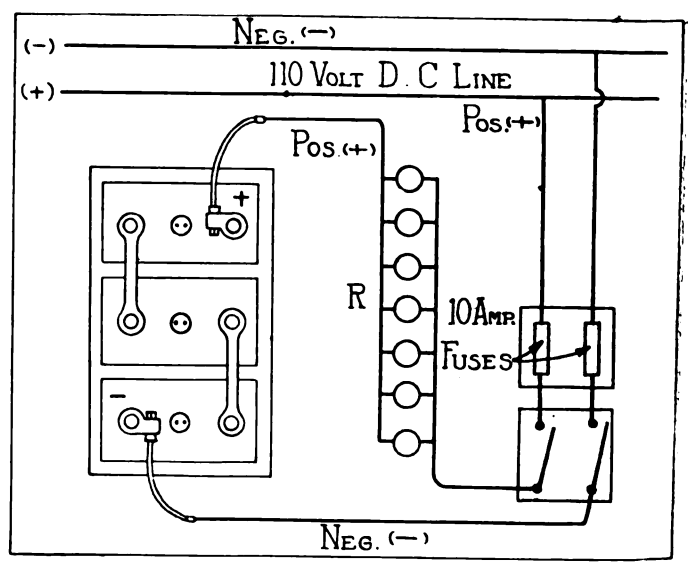


Fig. 537—Wiring Diagram for a Home-Made Storage Battery Charger.

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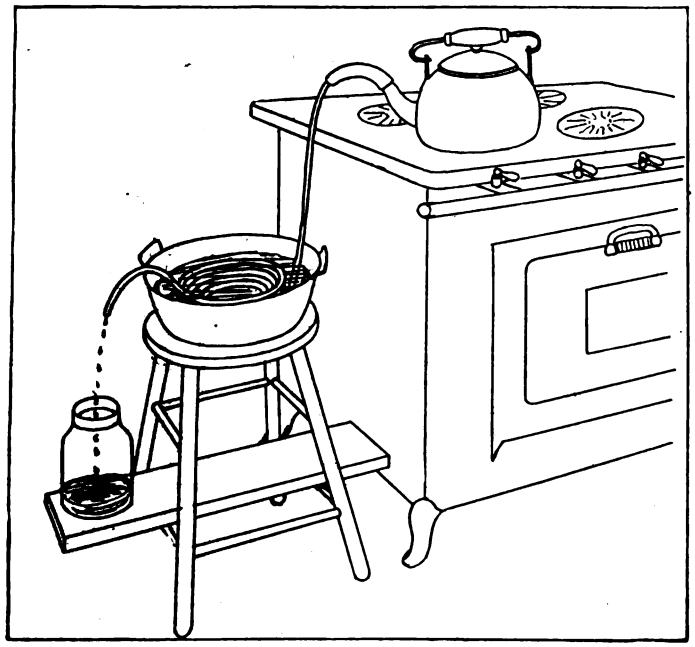


Fig. 538—Distilling Water for Storage Batteries.

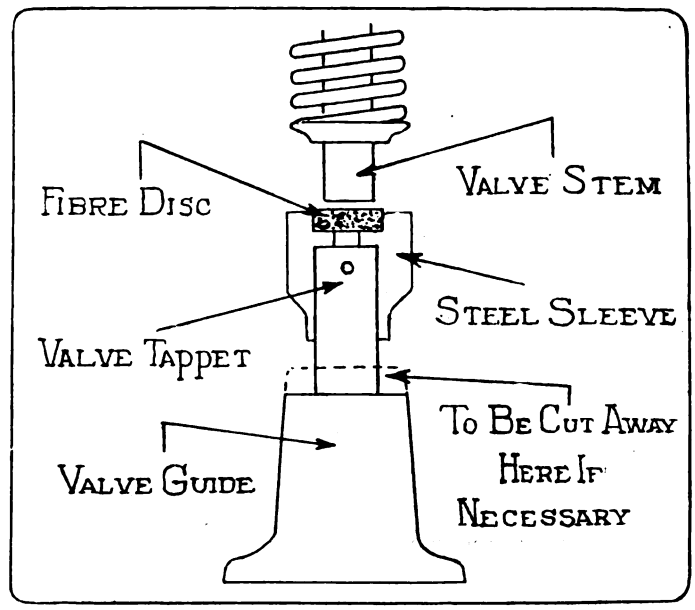


Fig. 539—Practical Method for Rectifying Noisy Valve Tappets.

and feeling for the slack while, with the right hand, the jack bar is given a slight up and down motion. Instead of a jack, a pinch bar, with fulcrum of suitable height, may be used for the same purpose.

MAKING DISTILLED WATER.

(Figure 538.)

Distilled water which is used in storage batteries is water that has been turned into steam and cooled and collected again. You can easily put up some for yourself at home with very little trouble. Coil a length of annealed copper tubing so it will fit in a dish pan, having each end in the position shown in the illustration. To the snout of a tea kettle connect one end of the coil by a rubber hose or tube and have the other end of the coil bent so the distilled water will drip into a bottle. Fill the dish pan in which the coil is placed with water, which must be kept cool either by frequent changing or by allowing a fresh supply to run into it during the process. When the water in the tea kettle begins to steam it will pass through the snout into the tube and through the coil, where it will be cooled and condensed into water again. It falls into the bottle as distilled water, being as pure as desired for storage battery purposes.

JACKING WITHOUT A JACK.

(Figure 540B.)

The means by which this may be accomplished is through raising one end of a short plank with a block of wood, a couple of bricks or any other "packing" material handy, thus forming an incline up which the wheel in question may be made to mount by driving the car in low gear. About a foot beyond the high end of the incline the packing blocks are placed, built up to a height of about two inches more than the normal clearance under the axle. On driving the car further ahead the axle drops down on this packing, leaving the wheel clear of the ground. To get the wheel back to "terra firma" it is easy to topple the packing over by pushing the car forward.

SILENCING TAPPET NOISES.

(Figure 539.)

The practise of lengthening the stems or tappets was once a common method of silencing noisy valve tappets, but at best it is unsatisfactory. In fact, it is productive of other troubles as serious and annoying as the noise and lack of power due to insufficient valve opening. Most all cars made today have adjustable tappets, and by taking a little time it is possible to provide the same advantages for cars without this feature. This is often done in one of two ways. The first and best method can be used only where there is sufficient material to work on. Assuming that you have the material, the first thing to be done is to have the tappets removed and have the hardening or temper taken out of them. This you can do yourself by heating the pieces to a dull red heat and allowing them to cool while immersed in a bed of sawdust. While this is not a very exact method, it is approximately perfect for the work in hand.

Having annealed the tappets it is best to cut about ⅛ inch from them, and also on each cut a fine thread, fitting a crowned nut and a shallow nut for a locking device. The crowned nut should be hardened and it is best to have it done by some one having experience and knowledge in this line. This scheme will be found to give you adjustable tappets that will wear a long time and may be adjusted to give as little noise as desired by exercising a little patience while doing it.

The other method is the one used before the adjustable tappet became so common. This consists of fitting a steel sleeve over the top of the push rod and in this sleeve make a recess to be filled with a piece of hard fiber compound, the whole to be held to the rod with a pin. This plan is shown in the illustration. If the cross section of the push rod is large enough the sleeve may be eliminated and the fiber packing inserted in a hole drilled in the top of the push rod.

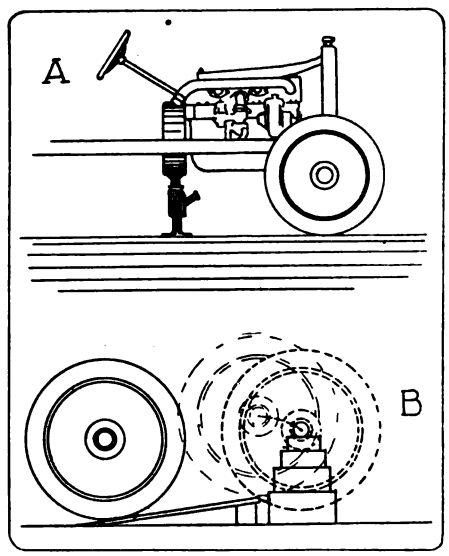


Fig. 540—(A) Locating Loose Bearings; (B) Jacking Without a Jack.

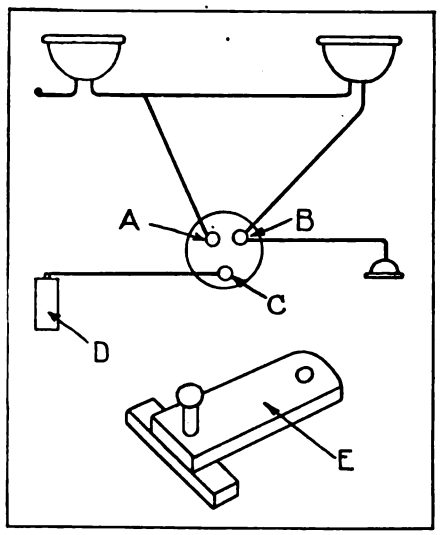


Fig. 541—Wiring for Ford Car Lights.

FORD HEADLIGHT CONTROL.

(Figure 541.)

Everyone knows that when the Ford car engine is running slowly on high speed the headlights do not furnish such a bright driving light as is given when the engine is running at full speed. Quite frequently it is necessary to drive through bad roads where the car speed does not exceed eight miles per hour for half an hour at a time. It is then that full light is most necessary, but not obtainable with the present wiring. We give a suggestion for wiring the Ford car in such a way that this annoyance may be minimized, as shown in the accompanying diagram. A, B and C are the three points of an ordinary switch, D is the magneto terminal. The insert E shows the switch bar, which swings on C, and the method of soldering a cross bar so that A and B may be connected at the same time. With the switch covering A and B a concentrated light is obtained in the left headlight. With the switch thrown to B only both headlights are lighted. Care should be observed not to run with the engine speeded up and only one light burning, as the light bulb will be burned out.

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Directory of Automobile Accessories, Parts and Supplies, With Descriptions, Illustrations and Prices

IN OFFERING the trade an up-to-date list of accessories, parts, fittings, machinery, tools, equipment and supplies, with descriptions, illustrations and prices of articles that are now in production or which are carried in stock and can be secured by jobbers and dealers, the Accessory and Garage Journal and Automobile Journal is offering a service that can be obtained through no other medium. This information is being compiled from the most recent advices direct from manufacturers.

The trade in the motor industries, whether dealing exclusively in automobiles or not, does not have to be told that from now on and for an indefinite period they must engage largely in the business of selling accessories, supplies and equipment. All must specialize in the repair, and the buying, selling and rebuilding of used cars if they intend to make money as in the past. Possibly extra effort will be required to keep business running as usual owing to conditions in the manufacturing field and difficulty of obtaining material and stocks. There is nothing in the situation to warrant the belief that there is to be any decided let up in the demand for all kinds of lines that are used in repairing or equipping automobiles, as there are over 5,400,000 cars being operated.

It is no time for rabid retrenchment. If a dealer feels pessimistic to the point that he keeps his stocks on a hand-to-mouth basis he better retire while he is whole as nothing will run him to the ground quicker than such a policy. The man who secures a good line of supplies and equipment this fall and winter, while obtainable, will have the goods to deliver for winter and spring business, which should be marked by a greater demand than in any previous season. All factors in the situation point to this condition. With few new cars to be delivered everyone of the 5,400,000 owners will of necessity purchase more accessories, supplies and equipment. Those who have very old cars in order to run them another year will have much repair and replacement work to do, while the millions of owners who have each year purchased a new car will spend a considerable amount on their machines to put them in first class shape. A condition indicated by their custom in the past of buying a new vehicle each season.

In the descriptions given where no mention is made of the maker's ability to deliver goods, it is to be assumed that the same situation would exist under normal conditions and that the article is procurable subject to the same transportation and manufacturing considerations as would obtain in these times.

Owing to present publishing conditions extra copies cannot be supplied, so it will be advisable to place subscription orders at once.

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Rain-Sno Clear View Windshield Cloth, as its name suggests, affords a means of providing against an obstructed view through the windshield from rain, sleet, snow or fog, and this result is secured at a minimum expense and with least possible effort, as an occasional wiping of the glass with the cloth prevents water in any form from adhering to the surface.

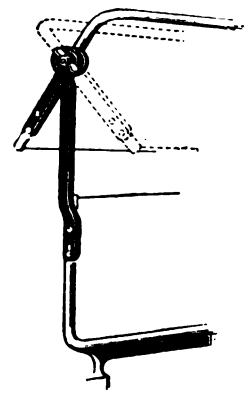
The use of this cloth for keeping a clear view through the windshield in stormy weather presents many advantages. It does not require constant handling to accomplish the desired result and when not required can be stored in a small pocket in the door or in under the seat. It is guaranteed to give continuous



and effective use for one year and is a cheap and simple means of preventing the many accidents that motor cars figure in owing to the driver's view being obscured by rain, snow or moisture on the windshield.

Manufactured by the Suffolk Manufacturing Co., Inc., Dept. D, 69 Long Wharf, Boston, Mass. By mail, postpaid, 50c each.

The Extension Swivel Hinges for Ford windshields, which have been placed on the market recently make possible the conversion of these shields into the "rain vision" type, which are used on practically all the larger cars and which have so many acknowledged points of superiority. Ford owners can enjoy the use of this type of shield now without incurring the expense of an entirely new frame and glass. With the use of these hinges the upper half of the glass becomes adjustable to any position either forward or backward and it can be so set that the operator can see the road in rain or storm without having his vision obscured by the accumulation of moisture

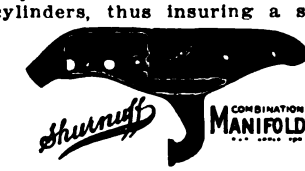


or sleet on the shield. It also affords a means of properly regulating the ventilation in front of the car and will direct a current of air as desired, keeping the legs cool and the dust, bugs and other flying objects from the eyes.

The change can be made in five minutes with the use of a screw driver, no drilling or machine work being necessary. There are three different models of Extension Swivel Hinges: A for 1912, 16, 17 Fords; B for 1913, 14 Fords, and C for 1918 Fords.

Manufactured by the General Auto Specialty Co., Inc., 151 Berkeley St., Boston, Mass. Price, $3 a set.

The Shurnuff Combination Manifold is a one-piece casting combining the intake and exhaust, being cast integral and so constructed as to allow the exhausted or fired gases to pass over the intake in such a manner that the incoming vapor is properly mixed and dried before entering the cylinders, thus insuring a smoother



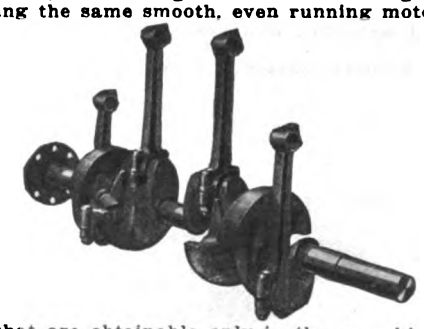
running and more powerful engine at all speeds and a saving of fuel.

Its efficiency in thoroughly vaporizing the mixture makes it possible to utilize the low grade gasolines, that have more heat units than the higher grades, which fact is responsible for the increased power, faster pick up and the ease in starting that results from the use of the combination manifold.

It is designed for the Ford engine and comes complete ready to attach.

Manufactured by the Shurnuff Manufacturing Co., St. Louis, Mo. Distibuted by the Zinke Co., Chicago, Ill. Retail price complete, $9; west of Rockies, $10; in Canada, $12.50.

Dunn's Counterbalances for all Ford cars are designed to balance the crankshaft, eliminating the vibration and giving the same smooth, even running motor



that are obtainable only in the very high priced cars. The unbalanced revolving weights traveling at a high speed set up wracking forces in an engine that will ultimately be responsible for ruinous wear in many of its parts, while all the time deteriorating the effect of the power impulses. It has long been a known and established fact that counterbalancing any engine that derives its power from a reciprocal stroke will increase its power and efficiency and greatly lengthen its service life.

Manufactured by the Dunn Counterbalance Co., 115 North 15th St., Clarinda, Ia. Price, $12 per set.

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The Sun Ray-Lens has a lens which is divided into a great number of small square prisms, designed to throw approximately 90 per cent. of the light directly ahead of the car, in a line parallel with the road surface. These square prisms are separated from each other by small triangles, through which the balance of the light given by the bulb is refracted to the sides of the machine, at an angle of about 168 degrees, affording light for determining the ditch lines. Immediate delivery is assured.



Manufactured by the Prismolite Co., 74 East Gay St., Columbus, O. Write for prices and literature.

The Woodworth Clear Light Lens for automobile head lights is a prism lens especially designed to prevent glare without absorbing light, but by directing its rays where they are most required. The upper half of the lens is so designed that it throws the light to the sides of the



road and the lower half is designed to throw the rays down on the road itself. Prompt deliveries to dealers and jobbers.

Manufactured by Woodworth Manufacturing Corporation, Niagara Falls, N. Y. Prices for set of two delivered: 8 to 8½ inch, $3; 8¾ to 9½ inch, $3.75; 9¾ to 11 inch, $4.50; 25 cents per pair additional west of Rockies. Discounts: 25 to 60 per cent. according to quantity.

The Crew Levick Fractor consists of a heavy half tone of glass, which is cast with wedge shaped projections around the circumference. The glass is mounted upon a ring which fits over the bulb. Due to the peculiar construction of the glass



and its refractive power, the Fractor bends all the rays of light so that they are reflected where needed on roadway.

Made by the Crew Levick Co., Philadelphia, Pa. Motor Parts Co., Philadelphia, national sales agents.



The Conaphore is a typical headlight glass of the first class and is obtainable in sizes ranging from five to 11½ inches in diameter, and in either plain or Noviol glass. Across the front of this glass are a series of horizontal prisms which refract the glaring beams and direct rays of light downward. A second series of squares, arranged in semi-triangular formation and extending over the center of the glass, are designed to reflect light towards the sides of the road. All of these prismatic panes are cast into the glass and being on the inside do not collect the road dirt and dust. The front is perfectly smooth. The Noviol glass being of yellowish tinge, absorbs the glaring rays of blue and violet and permit only the nonglaring rays to pass.

Marketed by Conaphore Sales Division, Edward A. Cassidy Co., Madison Ave. and 40th St., New York.

Retail Price List (per pair)	Noviol Glass	Clear Glass
5 to 6⅞ inches incl....	$2.40....	$1.60
7 to 8½ inches incl....	3.50....	2.50
8⅝ to 10 inches incl....	4.50....	3.00
10⅛ to 11½ inches incl....	6.00....	4.00

Prices 25 cents more per pair west of Rocky Mountains. Sizes vary by steps of ⅛-inch above 6½-inch size.

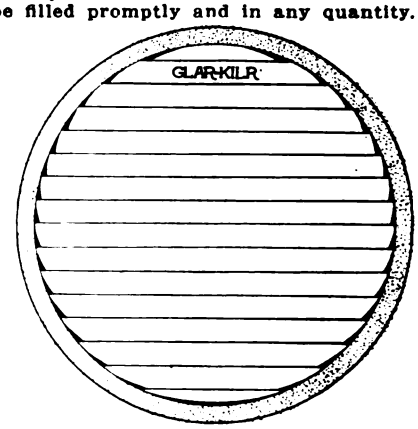
The Lennon Light, patent rights to which have been affirmed by the United States Court of Appeals, is a flexible brass reflector, heavily plated, which throws the beams of light on the road, and at an approved height from the ground, stops the glare which is prohibited by statute in many states. It is made in two sizes and will fit any headlight. The protectors are light in weight and simple in construction, having no extra springs or parts to become broken.



They are attached without removing the bulb from the headlight, the operation being to place the eyelet of the protector over the tip of the bulb and pressing it into position, where it is held firmly. Those rays of light that ordinarily would be thrown outward and upward into the eyes of oncoming motorists are reversed and directed downward. Prompt deliveries are assured.

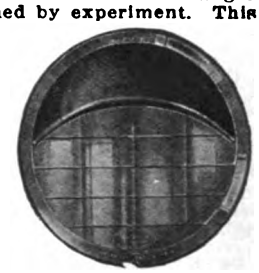
Manufactured by J. H. Faw, Inc., 37 Warren St., New York, N. Y. Retail price $1 per pair.

The Zorger Glar-Kilr Lens is composed of sectional cylinders one-half inch in width, with the axis horizontal. These sections are adjusted so that the rays cross or come to a focus three inches in front of the reflector. This gives a one-half inch spread every three inches or a two-inch spread every foot. The sectional cylinders are made so that the light does not attain an altitude of more than 42 inches in 200 feet. At 200 feet the spread from each one-half inch section of the glaring half of the reflector is 400 inches, 90 per cent. of which is stated to be below horizontal is diluted by diffusion approximately 800 times, not nearly sufficient to dazzle an approaching driver. The maker states that by using the cylinder he gets the same diffusion as any diffusing lens and in addition gets refraction or bending down of the rays. This lens bends rays of light down and diffuses them along the road where they are needed. The range of lighting from it is from 300 to 500 feet in front of the car, and a wide side light is thrown, showing clearly the side of the road. Orders can be filled promptly and in any quantity.



Manufactured by the Zorger Lens Co., Inc., Champaign, Ill. Prices, 7½ to 9 inches inclusive, $2; 9¼ to 10½ inches inclusive, $2.50; amber, 50c extra.

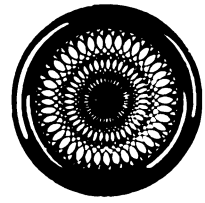
The Macbeth Lens has its front surface divided into five horizontal prisms, each of which is inclined at an angle that was determined by experiment. This arrange-



ment is said to direct the light below the horizontal, lighting the path of the car at the greatest distance possible, without having the glare of the lamps blind the driver of an approaching machine. A concave surface at the back of the lens results in the deflection of the rays to the sides. To eliminate any chance for rays to extend upward, the lens is fitted with a green visor, making the whole device ornamental.

Manufactured by the Macbeth-Evans Glass Co., Pittsburgh, Pa. Write for prices and literature.

The Nu-Ra-Lens is an attractive headlight glass, which is designed to prevent direct ray action with the attendant glare. This type of lens is mosaic in effect, with its surface broken into many small prisms, which deflect the light, but do not dim it. In this way all of the light from the bulb is thrown in front of the machine, but not in the form of direct rays.

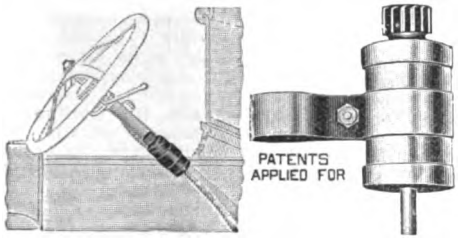


The manufacturers claim that though a perfectly white and clear light is projected, it possesses none of the objectional glare common to clear glass lenses.

Manufactured by the Nu-Ra-Lens Co., 74 East Gay St., Columbus, O. Prices from $2 to $3 according to size.

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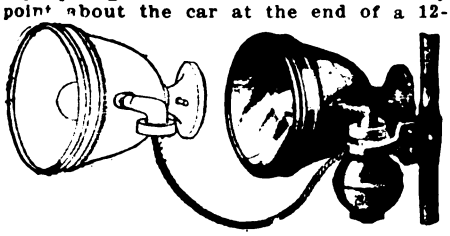
The Lite-A-Ford is an intensifying and regulating device for lighting systems of Ford cars with a dimming feature. By a series of coils the current from the engine is strengthened at low engine speed, while the same coils have a reverse action on high speed, causing the current to be retarded. This regulates and equalizes the lights to almost an even density at all speeds. At any time the lights may be



dimmed to any degree that it is desired by turning the knobs on the dimmer, which is attached to the steering column. Prompt delivery.

Manufactured by Hastings Manufacturing Co., Hastings, Mich. Price $2.50.

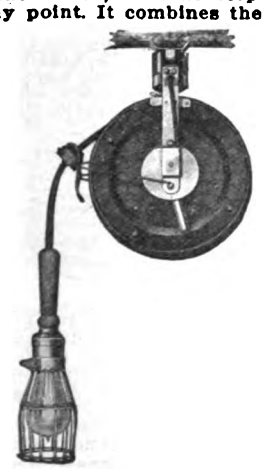
The Autoreelite is a spotlight, a searchlight, a flashlight and a trouble light all in one. It costs no more than the ordinary spotlight and it is moveable to any point about the car at the end of a 12-



foot extension cord, that when not in use is wound on an automatic reel.

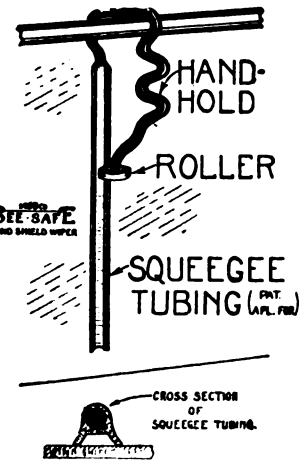
Manufactured by the Anderson Electric Specialty Co., 118-124 Clinton St., Chicago, Ill. No. 3140, model B-6 (six inch), price with rear view mirror, $8; No. 3141, model B-7 (seven inch), with rear view mirror, $9; without mirror deduct 50 cents.

The Automatic Extension Reel is nine inches in diameter by two inches in width, and is equipped with 25 feet of reinforced cord. The head is provided with a swivel joint, enabling one to carry the lamp in any direction from the reel, and an automatic lock, so that stop may be had at any point. It combines the advant-



ages of taking the light exactly where it is wanted, eliminating the necessity of dragging an extension cord over the floors, where the insulation is soon worn off and fire risks increased through short circuiting. The makers claim that so perfect is the reel's insulation and connections that they have withstood a test of an A. C. potential of 1250 volts—only 250 being required for lamp service. Orders filled promptly.

The Cincinnati Specialty Manufacturing Co., Inc., Cincinnati, O. Write for prices and literature.

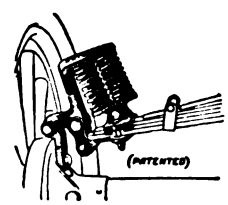


The See-Safe Windshield Wiper is so arranged that it may be drawn across the windshield, cleaning a rectangular space, or pivoted upon the top and swung in a half circle, serving to clear a space or cleaning the rain, moisture or sleet away from the windshield for its full width. The distinctive feature of the wiper is gained through the use of a special squeegee tubing. The effect of this tubing is that two flexible and parallel wiping surfaces are in contact with the glass, held closely against it by the spring action of the heavy rod on which it is mounted, and which passes over the top of the windshield and forms a hand-hold on the inside of the car.

Jobbers and dealers can secure a supply of the wipers during the entire fall and winter.

Manufactured by the Stadeker Metal Specialty Co., 358 W. Madison St., Chicago, Ill. Write for prices and literature.

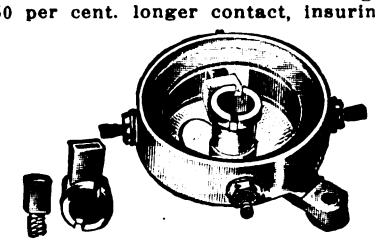
Champion Shock Absorbers are built exclusively for Ford cars and are designed to absorb the jar and recoil from the springs. The pivot seat of the two coil springs act as a bearing for the main springs and allow free oscillation of the



working parts. The car rides on the springs and off the springs, equalizing each motion in balance, making the action of one spring compensate for that of the other. Immediate deliveries.

The Champion Shock Absorber Sales Co., Indianapolis, Ind. Two for the rear wheels, $8; set of four, $15.

The "Hyway" Oilless Timer is developed on the system of brush contact used on all electric generators. The brush is special machined of hardened brass, slightly curved to fit the ring. It can be quickly and easily renewed when worn and is the only part necessary to be changed. This timer does not need to be oiled and gives a 50 per cent. longer contact, insuring a

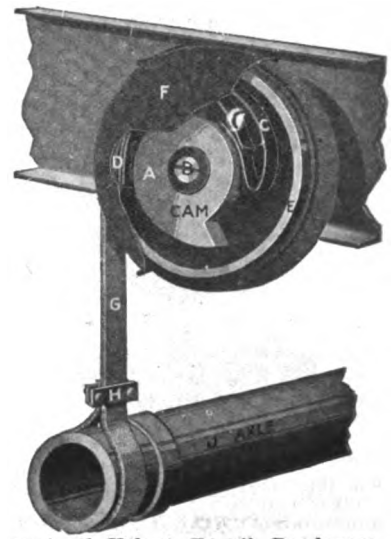


fat spark, which makes for better ignition. Deliveries can be made as wanted.

Manufactured by Staff & Eckhouse, 1432 S. Michigan Ave., Chicago, Ill. Price $1.25.

The Velvet Recoil Deadener, marketed by the makers of the Velvet Shock Absorbers is designed to restrain and soften the recoil of the springs.

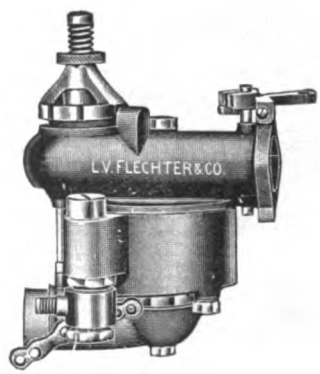
As will be seen by reference to the illustration the cam A is fastened stationary on the pivot bolt B, while the drum revolves on the bolt B. The spring C is fastened to the inside of the drum and when the car goes upward the drum revolves on the pivot B and the spring travels upward on cam A, gradually stopping the upthrow of the car. A spring on the opposite side of the device winds back the drum and the spring C immediately slides down on the cam A as the body of the car returns to normal position, and takes up the slack in the strap. Deliveries can be obtained on a reasonable



amount of Velvet Recoil Deadeners for large cars and Ford cars, also on Velvet Shock Absorbers for large cars.

Manufactured by the John W. Blackledge Manufacturing Co., 341 East Ohio St., Chicago, Ill. Write for prices, giving name of car.

The Flechter Carburetor's correct principles of vaporization and air mixing have been combined with simplicity of construction to a degree that insures unusual fuel economy with reliability of operation. Complicated adjustments that can only be properly set by experts have been eliminated entirely. In this carburetor a "fixed" nozzle or spray is employed. The orifice of this jet is calculated for the size of the carburetor and the type of engine on which it is employed, and it is unalterable, the only adjustments necessary being those regulating the air supply. The air adjustments act directly on the amount of air admitted and are of the simplest form. They are placed on top of the carburetor and will lock at any point for which they are set.

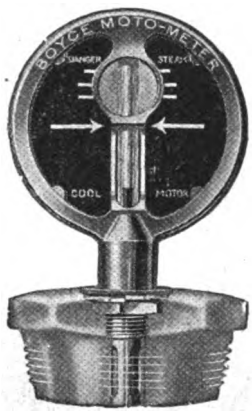


Both the low and high speeds are plainly marked so that they can be turned to the proper direction. Deliveries can be made in any quantity.

Manufactured by L. V. Flechter & Co., 192-200 Jackson Ave., Long Island City, N. Y. Write for prices and literature.

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The Moto-Meter is now being made in a special type for the owners of Ford cars, as they are likely to be just as ambitious as an owner of a much bigger machine to have their equipment complete, and, therefore, it comes to pass that makers of accessories of almost every kind have offered models especially adapted to the needs of Ford owners. And not to be left behind the makers of the Moto-Meter have added to their line a special Ford model, which is sold complete with a nickel plated radiator cap. The Ford Motor-Meter differs in no wise, so far as principle and operation are concerned, from other models It indicates by means of a column of colored fluid, plainly visible in the middle of a disk, the temperature inside the radiator, so that any trouble which tends to increase engine temperature at once betrays itself by pushing the column upward. It is well



known that most engine troubles make themselves manifest in the form of heat.

Manufactured by the Boyce Moto-Meter Co., Inc., of Long Island City, N. Y. The price of the new instrument, including the radiator cap, is $2.75. The Standard model costs $10, the Overland $10, the Junior $5 and the Midget $2.50.

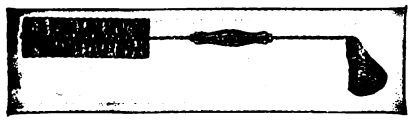
Micro Piston Rings are made in two parts and designed to eliminate piston compression leakage. The outer ring seals the opening in the inner ring, and it



is said that an equal expansion against the cylinder wall in all directions, produces perfect contact at every part. The makers can meet the demands of the trade and make prompt deliveries.

Manufactured by Micro Piston Ring Co., Inc., 110 Nassau St., New York. Prices upon application.

Rico Auto Cleaning Brushes, which line includes a wire wheel brush, wheel and hub brush and engine brush, are made of real China bristle, and are designed and shaped to meet the exact needs required

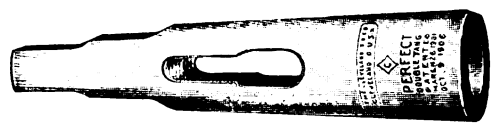




in thoroughly cleaning a car with the least trouble.

Manufactured by the Rich Manufacturing Co., 1777 Broadway, New York City. Prices, wire wheel accelerator brush, $1; wheel and hub brush, $2; engine brush, 75 cents.

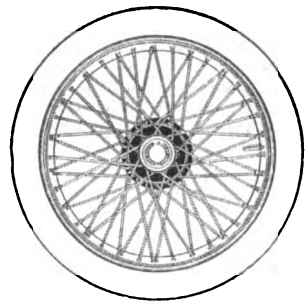
Perfection Double-Tang Sockets meet the demands of the time for conservation of steel, products and labor, as through their use any taper shank tool with a broken tang can be quickly and permanently reclaimed. When the tang of a tool breaks the workman steps to a grindstone and within several minutes has ground a new one, which is 25 to 60 per cent. stronger than the original. This tang is slipped into the socket and as any of the "P. D. T." sockets will nest into a



similar socket of the next larger size, any desired length of tang can be obtained. These sockets will also hold taper shank tools so that the tang will not twist off; can't get out of order, as there are no loose parts; fit any spindle with a regular taper hole.

Manufactured by the Cleveland Twist Drill Co., 9 N. Jefferson St. Chicago, Ill. Write for prices and literature.

The House Type Wire Wheels for Fords are less liable to collapse under the shocks of violent collision or skipping blows than the wooden wheels. Each spoke will stand a strain of 3200 pounds. There are 54 spokes in a single wheel. A set consists of five wheels, four inner hubs, four hub caps, one dust cover for spare wheel and two wrenches, one for



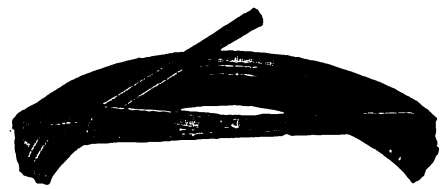
the hub caps, another for the spoke nipples. These wheels will stand up and keep going under all road conditions. The inner hub has 10 tapered serrations that fit into and grip the corrugations inside the hub shell. The mechanical locking latch is inside the hub cap and is released by a special wrench, but locks itself automatically to the inner hub.

Manufactured by the Wire Wheel Corporation of America. Factories: Buffalo, N. Y., and Springfield, Mass. Service department headquarters, New York City, N. Y. Direct factory branches and service stations in New York, Philadelphia, Chicago, Detroit, Los Angeles and San Francisco. Set of 5 wheels $65. In black, white or red enamel.

Brown Automatic Oiling and Grease Bolts are used extensively by automobile manufacturers who turn out a high class product. The automatic oiling bolt, while designed primarily for use as a spring shackle bolt, is adaptable to all kinds of mechanisms needing continuous feed for internal lubrication. Lubrication is effected by means of a reservoir wick or felt, positively attached to a threaded cap plug and one or more feed or filter wicks. When in position the reservoir is under slight compression that forces all surfaces of the felt against the interior of the bolt, the feed or filter wicks resting against the main reservoir and carrying oil to the bearing surfaces by capillary attraction. The bolts are made from cold drawn bar stock, heat treated and ground and are made in sizes of from ½x3 inches to 1x6 inches.

Manufactured by the Brown Co., Syracuse, N. Y. Write for prices and literature.

The G. L. T. Push and Pull Rim Tool is unlike all others in manner of operation and construction. The makers claim no pinching of the fingers or torn clothing, breaking tools or hammering rims out of shape in an effort to remove or replace rims from or to tires. The sliding or adjusting bar that must move to and fro travels in an E shaped heavily ribbed channel. There are no loose hooks, all parts firm and rugged. The slot in the connecting link allows adjusting bar to move backwards, allowing tool inside for unlocking rim, pushing joint apart and pushing rim and joint to place, also allowing bar to move forward for attaching hooks to outside of rim for pulling or contracting rim for removal of tire. It requires but a few seconds for the entire operation and the tool is very substantial,



of all steel construction, durable, simple and easy to operate.

The tool is made for and adjustable to 30, 31, 32, 33, 34, 35 and 36-inch demountable split rims.

Jobbers and wholesalers can obtain prompt deliveries.

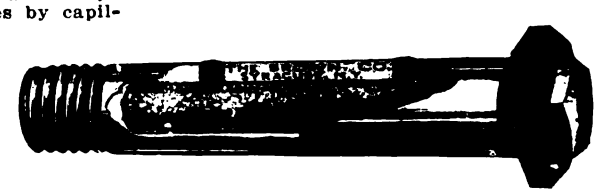
Manufactured by the Metal Products Manufacturing Co., 2416 University Ave., S. E., Minneapolis, Minn. Prices, plain, $3.50; japaned, $3.75; anti-rust, $3.85; white nickel, $3.95; bronze, $3.95, $4.25; oxidized, $4.50; polish nickel, $4.75.

Spoke Tite is a liquid preparation which tightens loose spokes and stops body squeaks. It is said to be uninjurious to painted or varnished surfaces and when applied causes the wood to swell and resume its normal proportions. The can is furnished with a handy spout and upon signs of looseness in the wheels a few



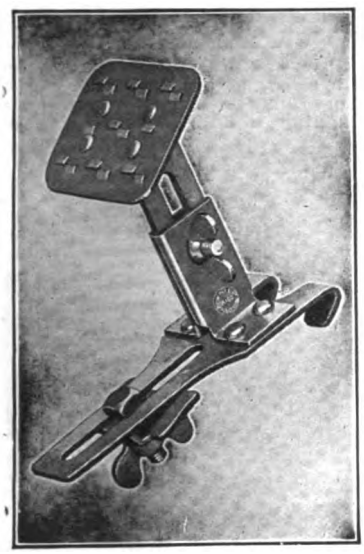
drops of Spoke Tite are squirted into the crevices formed by the drying up of the wood. The wheels may be left in place for the treatment and the action of the liquid is rapid. Prompt deliveries are assured.

Represented by Charlie Foster, 243 Columbus Ave., Boston, Mass. The price per can is $1.50, enough for four wheels. Distributed by Asch & Co., 16-24 W. 61st St., New York City, and Gray, Heath Co., 1440 Michigan Blvd., Chicago.



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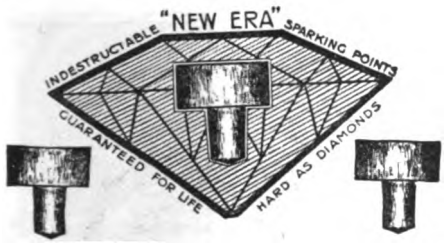
Rico Universal Extension Pedal fits every type of automobile brake and clutch pedal and makes it possible for anyone to accommodate their reach to



any driving position desired. It is easily and quickly attached and when in position is absolutely rigid.

Manufactured by the Rich Manufacturing Co., 1777 Broadway, New York City. Price, per pair, $4; with rubber cushions, $5.

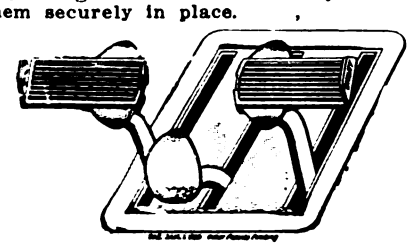
New Era Indestructible Sparking Contact Points are successfully used on all ignition systems except Bosch and replace worn vibrator points, or points in magnetos. They are made from an alloy of materials which the makers claim are harder than platinum. These points, the makers say, are indestructible and they back this claim with a broad guarantee of full replacement at any time, no matter what the reason.



No. 1, 9 Ga. wire, $\frac{13}{32}$" deep. Shank $\frac{1}{16}$" long....$1.00
No. 2, 12 Ga. wire, $\frac{7}{64}$" deep. Shank $\frac{1}{16}$" long...$0.60
No. 3, 9 Ga. wire, $\frac{1}{4}$" deep. Shank $\frac{1}{16}$" long....$0.75
No. 4, 10 Ga. wire, $\frac{13}{32}$" deep. Shank $\frac{1}{8}$" long....$1.00

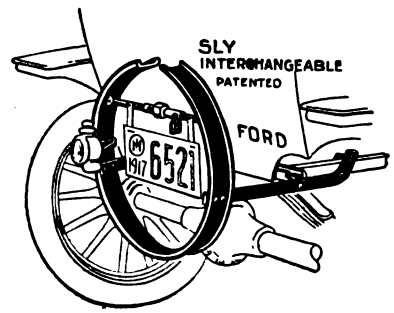
Manufactured by the New Era Spring and Specialty Co., 1177 Hamilton Ave., Grand Rapids, Mich. Prices from 60 cents to $1, according to sizes. Dealers, 50%.

Utility Sure Grip Pedals for Fords are made of pressed steel finished in black enamel and are equipped with heavy pads of rubber edged with metal. They are easily and instantly attached without the use of drilling tools, the tightening of a nut being all that is necessary to hold them securely in place.



Manufactured by the Hill Pump Valve Co., Archer Ave. and Canal Sts., Chicago, Ill. Price, $1.25 per pair.

The Sly Interchangeable Tire Holder is designed for both Ford and Chevrolet cars. It resembles a quick detachable rim and is bolted to the rear of the car. When the tire is in place an expanding device is turned, locking the tire upon the rim or holder, and can be used with or without demountable rims. A padlock prevents



the loosening of the expansion nut and prevents removal by an unauthorized person. On the holder are provided places for a number plate and a tail lamp.

Manufactured by New Era Spring and Specialty Co., 1177 Hamilton Ave., Grand Rapids, Mich. Price, $5. Special terms to jobbers.

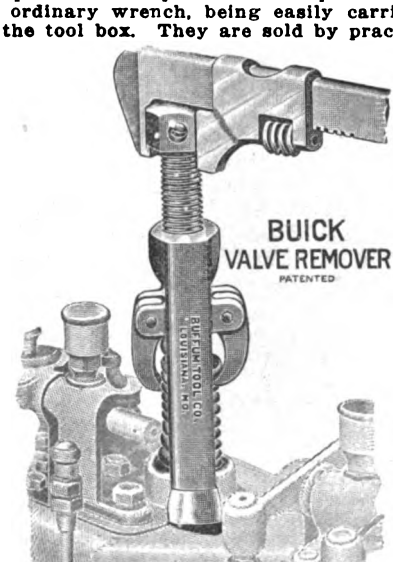
Titanic Springs are strengthened by a reinforced patented arch and attached to a clamp entirely outside the spring. These springs, the makers claim, are guaranteed forever against center breakage, and for one year against breakage at all.



Quick service is claimed by the manufacturers who keep a large stock of ready-to-ship springs for practically every make of standard cars. Distributing stations are established in all large cities throughout the country.

Manufactured by the Tuthill Spring Co., 700 Polk St., Chicago, Ill. Write for prices and literature.

The Buffum Buick Valve Remover is quick, sure and safe, obviating the danger of bending washers, valve stems and valve springs or breaking the valve cage. It lifts the valve straight up with a strong, steady pull and fits Buick engines of all models since 1912. It is light and compact and occupies no more space than an ordinary wrench, being easily carried in the tool box. They are sold by practically all jobbers and dealers in automobile accessories.

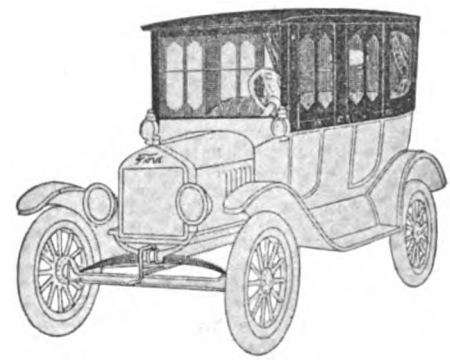


Manufactured by the Buffum Tool Co., Louisiana, Mo. Price, $2.

The Cozy Top for Ford cars embodies the features of the "Springfield" permanent top construction. It affords all the comforts and protection provided by the coupe, sedan and limousine types of body, and it also greatly improves the appearance of the car.

The strong feature of the Cozy Top is the Hunter Automatic Curtain, which is the most ingenious and practical device invented for this purpose. It is always ready and yet never in the way. It is out of sight under the roof when one wants the car open and in one second the car can be closed without leaving the seat.

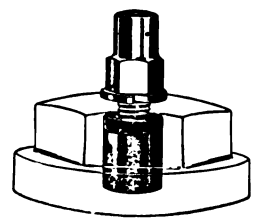
This top is carefully crated and shipped knocked down, in order to secure the low-



est possible freight rates. The Roadster Top is shipped in five pieces, the Touring Top in seven pieces. It requires no special tools to put it on the car—just a hammer, a wrench, a screw driver and about one hour's time.

Manufactured by Founts & Hunter Co., Terre Haute, Ind. Write for prices and descriptive literature.

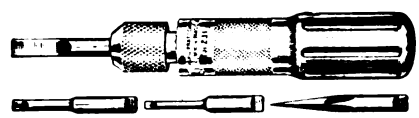
The Imperial Gas Tank Seal meets the call of the times for gasoline economy Perhaps the greatest waste of gasoline has been the one least thought of—that which evaporates or is jolted through the vent hole of the gasoline tank. Tests at the Armour Institute of Technology and the Associated Engineering Laboratories



have proved that this waste of gasoline can be stopped by the Imperial Gas Tank Seal. It works equally well with gravity or vacuum systems and is so simple it cannot get out of order. The valve admits air automatically to replace the gasoline that is drawn out. It is easily installed in a few minutes time, fitting in a hole in the filler cap three-eighths of an inch in diameter.

Manufactured by the Imperial Brass Manufacturing Co., 517 S. Racine Ave., Chicago, Ill. Price, $3.

The Goodell-Pratt Pocket Screw Driver No 231 is especially handy around the automobile for the reason that it is always handy in the pocket. The handle



is made of steel, nickel plated, so that it will not rust. The chuck may be reversed and fitted into the handle in such a manner that the extreme length of the tool is but 3¼ inches.

Manufactured by the Goodell-Pratt Co., Greenfield, Mass. Price, $1.

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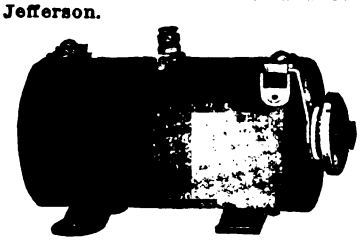
The Automobile Ignition Coil situation has in the past been a serious problem for jobbers, dealers and service stations, owing to the multiplicity of types on the market. Many jobbers and dealers have had to pass up the coil field almost entirely because of the large and varied stock of coils that would be necessary to take care of all requirements.



Jefferson Remy Coil.

The Jefferson Electric Manufacturing Co. of Chicago have recently placed on the market a line of battery replacement coils and fittings which are sufficiently flexible to displace any type of coil on battery equipped cars. The extreme flexibility of Jefferson coils is obtained from several features, which include the fittings, adjustable caps, terminals and mounting arrangements.

With a small stock of Jefferson coils any service station, garage or repair shop will be prepared for any emergency. Heretofore it has been necessary to lay up a car for perhaps several days while a new coil was being obtained. Now, however, any car can be placed in service within a few moments. It is only necessary to remove the old coil and connect the Jefferson.



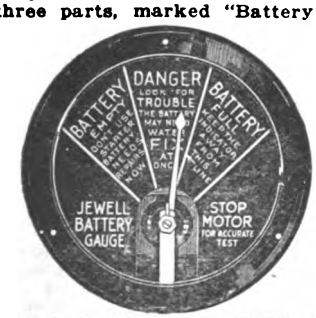
Jefferson Delco Coil.

Starting conditions require a coil that will produce a hot, intense spark when the battery is at the lowest ebb. Jefferson coils are guaranteed to take care of this extreme condition.

To aid jobbers, dealers, service stations and garage men the Jefferson Electric Manufacturing Co. have compiled a folder containing complete and authentic data covering all standard battery ignition systems. This folder lists all makes of cars from 1912 to the present date and gives the year, model, type of ignition and style of Jefferson coil to be used for replacement. This folder will be sent free of charge to any dealer, garage, service station or jobber. Deliveries from stock.

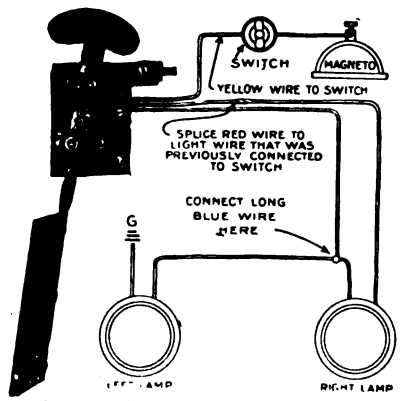
Manufactured by the Jefferson Electric Manufacturing Co., 429 South Green St., Chicago, Ill.

The Jewell Battery Gauge is a finely adjusted volt meter permanently located in the battery circuit and so calibrated that the slightest variation in voltage is immediately indicated. The dial is divided into three parts, marked "Battery Full," "Danger" and "Battery Empty," respectively, with instructions in each of the latter two compartment sections showing what should be done in the event the indicating needle marks these sections. The installation involves only placing of the gauge on the instrument board or any other convenient location and connecting the two binding posts on the back of the gauge to the main terminal of the battery, all of which is done in a few minutes.



Distributed by the Gray-Heath Co., 1440 South Michigan Ave., Chicago, Ill. Price $6.

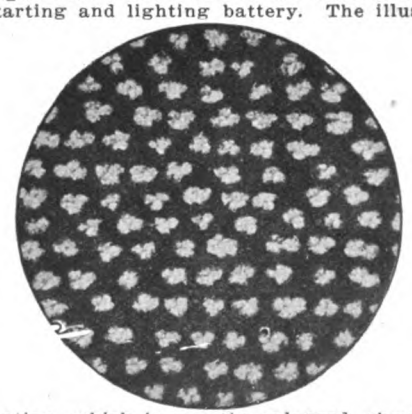
New York Automatic Head Light Controller for Ford cars eliminates trouble of varying light given by the car headlights. The Rear Light Controller consists of an arm which is attached by means of a stud to the base of the device. To the lower end of the swinging arm is attached an aluminum disc, which



when in position on the engine is about eight inches back of the fan. The base is fitted with three contacts, over which the swinging arm travels. When the engine is started the arm, by spring tension, is brought to the first contact and only the left headlight receives current. The total current from the magneto is sufficient to illumine this single headlight to its full candle power. As the engine speeds up the air current, acting on the swinging arm disc, carries it to the second contact and both bulbs receive current. Should the engine speed increase still further the arm would contact with the third connection and a resistance coil introduced into the circuit, preventing the burning out of the lights from excessive current.

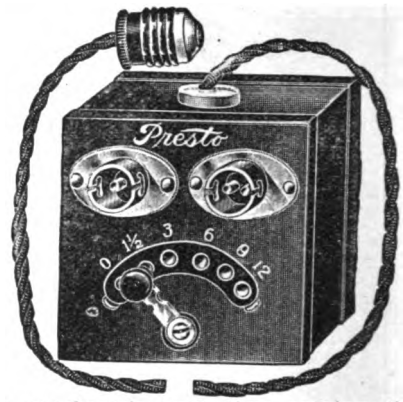
Manufactured by New York Coil Co., 338 Pearl St., New York, N. Y. Price $6 complete with wiring.

The Willard Threaded Rubber Insulation is one of the most important of many marked improvements which the Willard organization has made in the automobile starting and lighting battery. The illustration, which is greatly enlarged, shows a section of the threaded rubber insulation used between the plates of the battery. Each whie spot is the end of one of the 196,000 threads which pierce the rubber plate or sheet from front to back. Each one is in reality only 1/32 of an inch in length and of such small diameter that it is not noticeable to the naked eye. The plates are perfectly protected and the solution has free passage by capillary attraction and because of the enormous number of threads the full power of the battery is always available.



Manufactured by the Willard Storage Battery Co., Cleveland, O. Write for prices and booklet entitled "The Wick of the Still Better Willard."

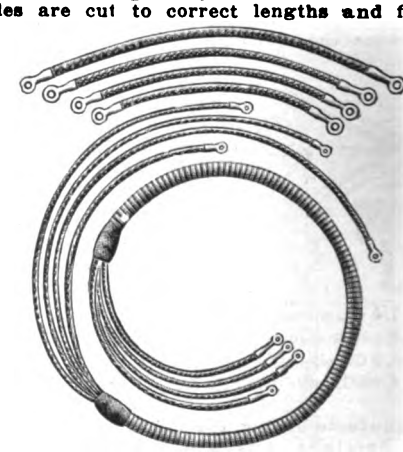
The Presto Bulb Tester is designed to test all sizes of automobile bulbs that have an Ediswan base and the dealer when selling a bulb can test it before



the purchaser's eyes, thus proving that the bulb is perfect and also that it is of the correct size for installation on that particular car. The switch lever at the front has contact points for 1½, 3, 6, 9 and 12 volt bulbs. It can be attached to any ordinary 110 volt socket and is equipped with seven feet of lamp cord. The device is enclosed in a neat metal case of black enamel with trimmings of nickel plate. Prompt deliveries.

Manufactured by the Metal Specialties Manufacturing Co., 338-52 N. Kedzie St., Chicago, Ill. Write for prices and literature.

Ford Ignition Outfits include a complete set of primary and secondary wiring of the highest grade wire. The cables are cut to correct lengths and finished with soldered terminals or black rubber nipples if so desired. Low tension wires protected with cable insulation are furnished where the wiring is exposed to grease or oil drippings. The wires are in contrasting colors, which make sure of proper replacement.



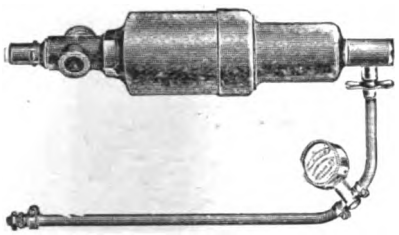
Manufactured by Staff & Eckhouse, 1432 South Michigan Avenue, Chicago, Ill.

Ohio Karbon Killer is a compound which, when mixed with gasoline, eliminates old carbon reposits in the engine and prevents further accumulations according to the claims of the makers. It contains no ether, camphor, acid or other ingredient that would harm the motor or clog up the gasoline feed lines. It comes in condensed form and is used at the rate of one level teaspoonful to five gallons of gasoline. The amount to be used is dissolved in gasoline and then poured into the fuel tank. A can of one pound is enough to treat 480 gallons.

Manufactured by the Ohio Grease Co., P. O. Box 22, Loudonville, O. Price per pound, $1.

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The Brown Impulse Tire Pump offers a simple, effective and ready means of inflating tires on automobiles without the laborious work of operating a hand pump. It can be used with any four-cycle motor and is attached in a moment's time by removing the core of the "B Co.'s" spark plug and putting the pump in its place. The tubing is then connected with the tire valve and the engine is



started. The impulses of the engine operates the plunger in the pump and the tire is filled with pure, fresh air to any desired pressure.

The pump is made of the best materials obtainable and is worked up with the same care as is employed in constructing a high class motor. Its construction is rugged and simple making it practically fool proof with ordinary care.

Manufactured by the Brown Co., Syracuse, N. Y. Price, $12.

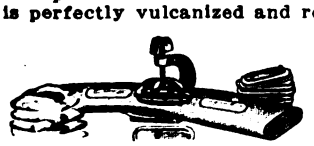
The New Amazon Cord Supertire is of multiple ply construction, each cord is separated from the others by an insulation of rubber. Each cord performs its functions independently. Friction and consequent heat are impossibilities. Its increased air space gives unusual buoyancy and resistance to stone bruises. Almost three-quarters of an inch of sturdy side wall above the bead makes it mechanically impossible for rim cuts to occur the makers claim.



The heavy tread is of the same design and compounding as the regular fabric Amazon Supertire. The new cord has a jet black, ebony tread, with a broad pearl gray side wall.

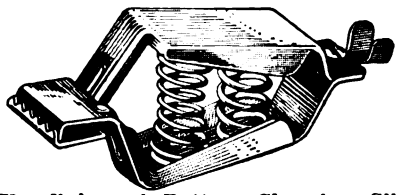
Manufactured by the Amazon Rubber Co., Akron, O. Prices: 34x4½, $67.25; 36x4½, $70.55; 35x5, $83.60; 37x5, $87.60; 36x6, $100.50.

The Magic Vulcanizer is an ingenious little device that vulcanizes patches on inner tubes in five minutes time, disregarding all weather conditions. The patch is simple and effective. A lighted match applied to the chemically treated cartridge in the top of the tin cap provides the heat units necessary to penetrate the patch and in a few minutes the tube is perfectly vulcanized and ready for



instant use. There is no flame, no danger of fire and the strongest wind cannot blow it out. The complete outfit, including clamp and 12 vulcanizing patches take up small space in tool box. Prompt delivery.

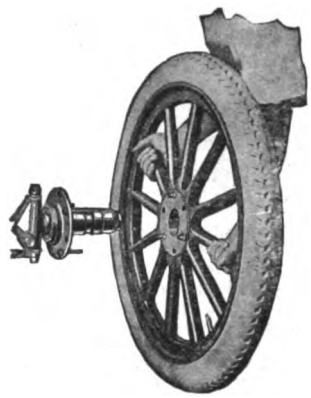
Manufactured by Magic Auto Devices Co., Inc., Lynbrook, N. Y. Price, $2. Extra patches, the dozen, $1.



The Universal Battery Charging Clips are for use as a quick and ready means of connecting storage batteries for charging. They enable one to charge lighting and starter batteries without disconnecting them from the car. Being made with spring jaws fitted with sharp teeth, they bite through dirt and corrosion on terminals and make contact with the metal certain. The trouble caused by loose connections is eliminated with this form of contact. Deliveries from stock for next eight months.

Manufactured by R. S. Mueller & Co., 424 High Ave., Cleveland, O. Write for prices.

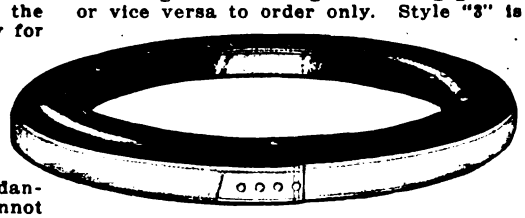
Ford Demountable Wheels and Carrier are, the makers claim, a wonderful improvement over demountable rims. The tire change is easily and quickly made



by the simple removal of three nuts and without the soiling of hands or clothing. This wheel has less weight than demountable rims and a better balance, as most of the weight is centred at the hub instead of the rim. The outfit includes an extra spare Ford wheel and an artillery type carrier, which device adds materially to the appearance of the car and is instantly available when wanted. Prompt delivery.

Manufactured by the J. P. Gorman Co., Inc., 382 Canal St., New York City, N. Y. Price, $15. Write for literature.

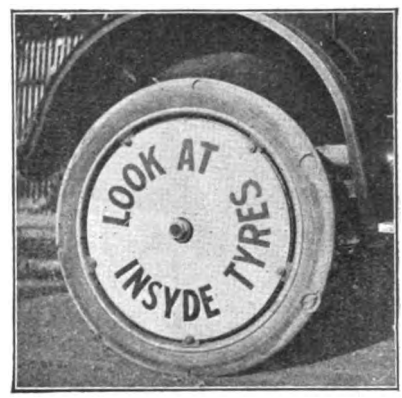
The Allen Tire Case has a patented water shed feature which the manufacturers claim make it absolutely water proof. The highest quality enamel duck is used. Its strong canvas backing and non-peeling coating make it the best possible material for the purpose. Style "1" is a regular stock cover in plain black enameled duck which harmonizes with any car. This style is also furnished in any solid color at $1.50 additional. Style "2" is made of enameled duck or fabric leather with the body of the case to match the color of the car and the tread strips matching the trimming or running gear—or vice versa to order only. Style "3" is



the latest in case styles, made in fabric leather or enameled duck to match colors of car with beading to match the trimming. Prompt delivery.

Manufactured by the Allen Auto Specialty Co., 16-24 West Sixty-First St., New York City, N. Y. Prices, $8 and up.

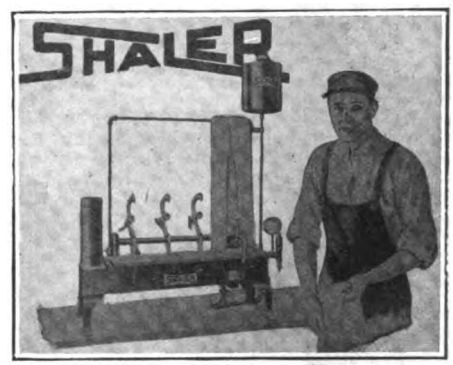
Insyde Tyres are designed to secure additional mileage from tire casings, even those which have worn to a point where further use with the ordinary inner tube is impractical. They are made of heavy tough fabric, vulcanized together over tire molds so that they exactly fit the shoe. The outside is coated with rubber, which eventually vulcanizes itself to the casing and prevents slipping. The inside is treated in such a manner as to prevent it sticking to the tube. It is claimed that by means of an Insyde Tyre the air pressure strain is removed from the casing,



thus leaving it free to carry the weight of the car alone. Prompt deliveries.

Manufactured by American Accessories Co., 1700 Blue Rock St., Cincinnati, O. Prices upon request.

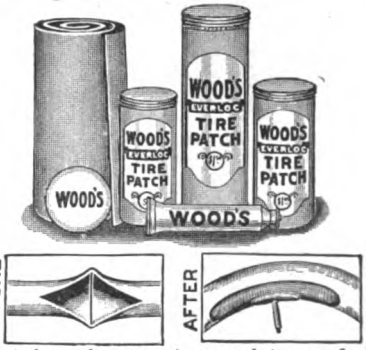
The Shaler Tube Vulcanizer repairs four tubes at one time and vulcanizes perfectly any size or shape of puncture or cut up to two feet in length. It is easy to operate and requires no watching or regulating, for it has automatic heat control. It takes up very little room and can be placed on a work bench or moved about



at will. Furnished with either a gas or gasoline burner or both. Prompt delivery.

Manufactured by the C. A. Shaler Co., 253 Fourth St., Waupun, Wis. Type "L-40," $35.

Wood's "Everloc" makes a permanent repair on the smallest puncture or largest blow out on tubes without vulcanizing. The patch comes rolled in container,



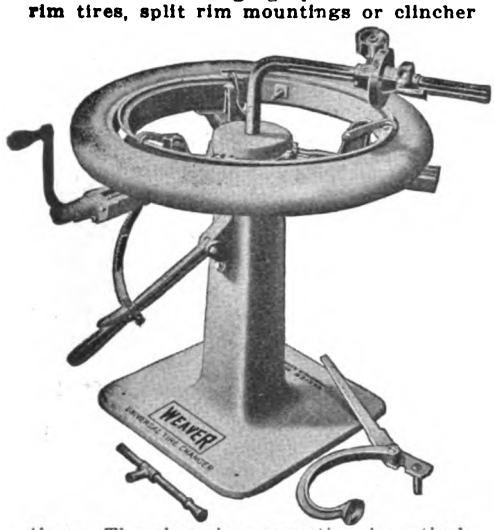
with tube of cement complete, and the makers claim a permanent job on any puncture from a nail hole to a cut or blow

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out 17 inches in length, which can be applied in five minutes. Orders in any quantity filled promptly.

Manufactured by W. C. Wood Co., 74 Western Ave., Minneapolis, Minn. The $1.50 patch is made in sheets 6x18 inches, $1 patch 3½x18 inches, 50 cent patch 2x15 inches, and can be cut to any size desired. Large sheets will repair 100 one inch cuts, or 250 nail punctures.

The Weaver Universal Tire Changer is designed for the rapid changing or mounting of tires. It reduces to a minimum the time for changing quick detachable rim tires, split rim mountings or clincher



tires. The changing operation is entirely mechanical and the device is so arranged that little effort is required. The manufacturers claim that there is no damage to tire hazard present since all the pressure is brought upon the tire by means of roller contact. Orders filled immediately.

Manufactured by Weaver Manufacturing Co., Springfield, Ill. Write for literature and prices.

The Weaver Tire Spreader is a device for inspecting the interior of casings, which operation is always necessary in repairing every puncture, blow out or other damage to either tube or casing. By means of a quick acting foot lever the



casing is spread to its limit, thus exposing the interior for convenient and efficient inspection. It will be noted from the illustration that the convex plate which forms the table of the tire spreader is equipped with hooks, which after the casing is spread by means of the jaws, can be applied to the bead at each corner of the plate, thus holding the tire permanently spread and with a solid backing. The casing with the plate of the tire can then be lifted off of the spreader and carried to the buffing wheel and the break in the casing buffed to the best possible advantage. A nest of rollers, which are designed to protrude through the buffing plate, carry the weight of the tire when it is being revolved on the spreader for inspection. These rollers, however, are suspended on spring tension, which allows them to be pressed down flush with the face of the spreader plate as the force of the jaws is applied to the beads of the casing for spreading. The shipping weight is 60 pounds. Orders filled immediately.

Manufactured by the Weaver Manufacturing Co., Springfield, Ill. Write for prices and literature.

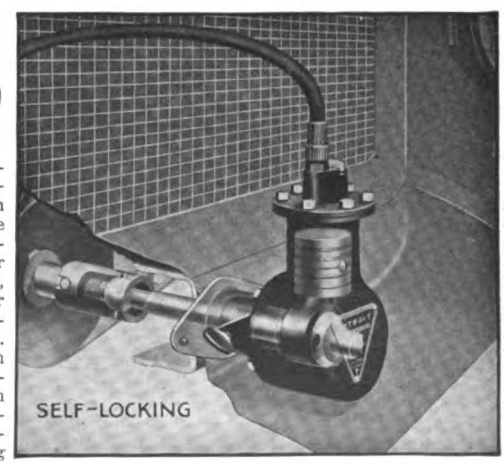
No. 66 Brunner Air Compressor is a portable outfit designed for inflating tires direct, without the aid of a tank or storage system. It is mounted on a substantial cast iron truck having three wheels, and is very durable and convenient to move about. The handle is strongly constructed of convenient height, and has substantial hooks for holding the electric cord and air hose when not in use. It is heavily built with standard No. 26 compressor, having accurately ground cylinders, pistons and piston rings. The motor is specially built, fully enclosed, affording ample power for operation under all conditions, and it may be operated from any light socket. All accessories are included to make the outfit complete and ready to



operate when removed from shipping crate. A small chamber is supplied to precipitate the moisture from the air before entering the tire. Prompt deliveries.

Manufactured by the Brunner Manufacturing Co., Utica, N. Y. Write for prices and literature.

The "Detroit" Crankshaft Tire Pump is driven directly from the front end of the engine crankshaft, being attached in exactly the same manner that the hand crank is connected. It is locked in position and held from turning by a clamp or screw and is connected to the end of the engine crankshaft by a short ball joint shaft or coupling, which drives it. Each downward stroke of the piston draws in clean, cool air, and each upward stroke forces it through the tube into the tire. The only attention necessary is a spoonful of hard graphite grease about once a season. It is made as carefully as a little engine. Cylinders, crankshaft and pistons are ground to close limit. Regular engine type high compression piston rings and standard engine type valves are used. Outfit includes 14 foot hose and connection for pocket gauge. Prompt deliveries.



Manufactured by the Detroit Accessories Corporation, Gratiot and Fisher Aves., Detroit, Mich. Price $12. Write for size adapted to your car.

The Standard No. 542 Brunner Air Compressor has a capacity of 2½ cubic feet of free air per minute. It is geared by means of a cloth pinion gear and a cast iron spur gear to a ½ horsepower motor, bolted to a substantial iron base, and is



mounted on a 32 gallon welded open hearth flange steel tank tested to 300 pounds. Its height is 34 inches and occupies a floor space of 18 by 36 inches and can be attached to any lighting socket.

Manufactured by the Brunner Manufacturing Co., Utica, N. Y. Price with 110 or 220 volt direct current motor, $195. With one phase 60 cycle 110 or 220 volt A. C. motor, $210. (A. C. motors of other than 60 cycle at additional charge). Write for literature.

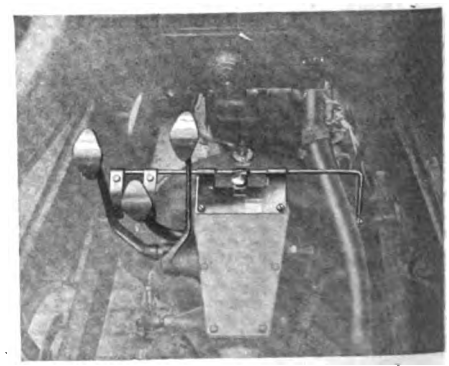
The Foster Auto Repair Creeper is mounted on ball bearing, free running castors and is durably finished in baked-on black Japan. Metallic throughout it stands up under severe usage and its advantages over the wooden creeper are evident. The galvanized link spring fabric supports the body comfortably and the



head rests upon a cotton filled pillow. The give of the springs allows free movement and an adjustable arm anchors the creeper firmly to floor so workman can exert his full strength. Prompt deliveries.

Manufactured by Foster Bros. Manufacturing Co., Utica, N. Y. Price, $4.

The Speederator combines a foot accelerator with an automatic controlled advance and retard for speed changing on the Ford car. It eliminates the necessity of any and all hand operation of the steering post throttle and automatically idles the engine in changing speed. When low or reverse clutches are engaged the engine is supplied with more gas automatically and speeded up. As soon as these clutches are disengaged the gas is automatically cut off, preventing the rac-



ing of the engine, and making the change from low to high, which is so difficult for amateurs, an easy matter. In addition to the automatic feature is provided a foot throttle or accelerator, rendering driving convenient and identical with high priced car methods of control. Prompt deliveries.

Manufactured by the Detroit Starter Co., Detroit, Mich. Price, $4.85.

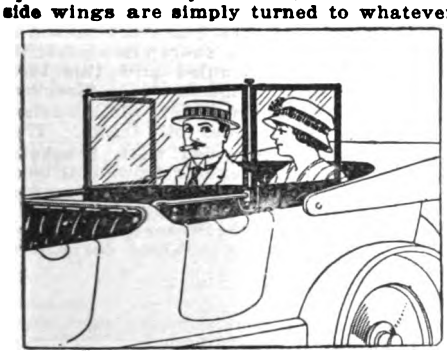
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The Dodge King Bolt Wrench meets the long requested demand by repair men for a special wrench on King bolts and it is now manufactured in quantity so that the wrench can sell at the list of $2.50, making the net price to the repair men so small that they cannot afford to be without one of these tools. It is made of the best steel and is light and compact, fitting the hand readily.



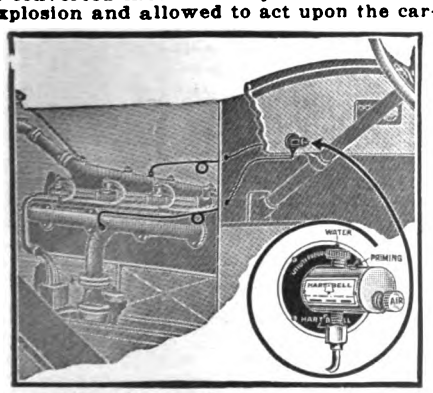
Manufactured by the Walden Worcester Co., Inc., Worcester, Mass. Price, $2.50.

The "J. H." Tonneau Shield is adaptable for use on any car built. It is mounted on a pair of extending steel arms, which are attached to a pair of steel body irons, which in turn fasten securely to the frame of the front seat beneath the upholstery. When once raised a push enables one to open or close the shield and place in whatever position desired, whereupon it is held by the friction locks. The side wings are simply turned to whatever position desired and they lock by friction. Placed at an angle they deflect the wind. When the shield is not in use it folds against the back of the front seat, taking about the same amount of room as would a robe. Orders filled promptly.



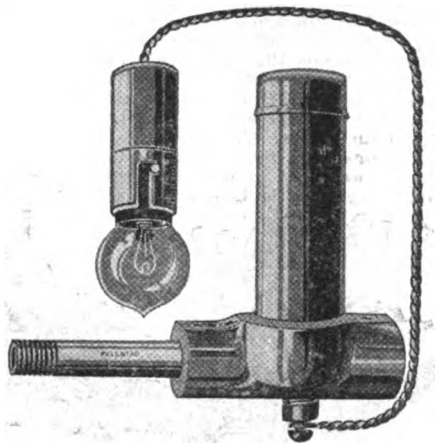
Manufactured by the "J. H." Tonneau Shield Co., New York City, N. Y. Price, $60. Dealers' discount, 20 per cent.

The Hart-Bell Carbon Remover, which is easily installed upon the dash or under the hood, conveys a little water in controllable quantities to the intake manifold, where it becomes vaporized and is sucked into the cylinders with the gasoline. It is converted into steam by the heat of the explosion and allowed to act upon the carbon while the engine is running. An added feature of the device is an auxiliary air adjustment, making it possible to introduce a little air when the engine is hot into the intake manifold by merely turning the valve marked "Air," which results in a more complete combustion of gasoline, increased mileage and a smoother operating engine. Prompt deliveries.



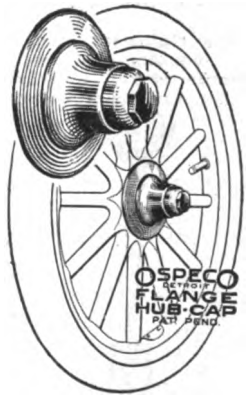
Manufactured by the Hart-Bell Co., Inc., 1926 Broadway, New York City, N. Y. Price, $6. Under the hood type, $6.

The "Safety First" Oil Signal is very simple in construction and is light and exceptionally well finished. There is nothing to get out of order and once it is properly installed it requires no attention. The principle is simple. As soon as the oil in the crank case gets low—within about 20 miles run of the danger point—a contact is formed at a given point, causing a light to flash, which is located on the dash in plain sight of the driver. The light will then burn constantly until the oil supply is replenished, which will automatically break the contact and the light goes out and remains out until the oil again gets low. Prompt deliveries.



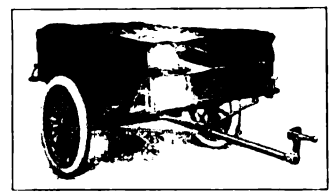
Manufactured by "Go" Motor Speeder Co., Three Rivers, Mich. Price, $4.50.

The Ospeco Flange Hup Cap is designed to replace the original Ford hub cap. They are rugged and distinctive in design and add materially to the appearance of the car. They are easily installed by merely screwing them on just like the old hup caps. Prompt deliveries.



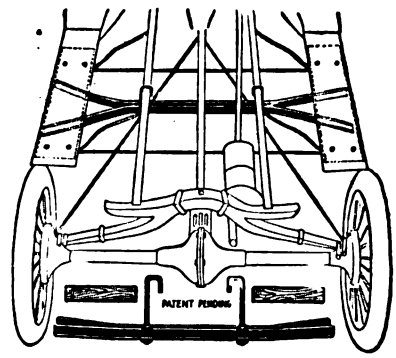
Manufactured by the Michigan Auto Products Co., Detroit, Mich., and Cincinnati, O. Price, $5 per set of four.

The Auto-Kamp Trailer enables one to live out of doors. It is a trailer to be drawn behind the car and when extended is a fully equipped home wherever one happens to be. It is a sleeping tent with two comfortable double beds, with real sagless springs, mattresses and bedding. It also has an ice box, two-burner gasoline stove, electric light outfit and table. The tent is water proof, wind proof and insect proof. It all folds compactly when on the road, under a dust proof, close fitting tarpaulin. It can be set up in seven minutes by one man alone. There are no bolts, nuts or clamps. The beds simply fold over on strong hinges. The tent frame is put in sockets, the bed legs are hinged and the whole is securely braced, being firm and rigid when in place. It attaches by universal socket and follows behind the car at any speed, over any kind of a road easily and silently. Prompt deliveries.

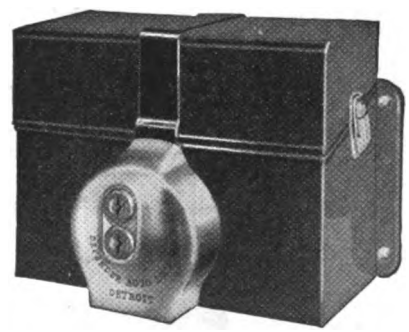


Manufactured by the Auto-Kamp Equipment Co., Inc., Saginaw, Mich. Price complete with full equipment and solid tires, $235. With pneumatic tires, $250.

The Presto Body Brace is designed to support the running boards on the Ford car. It is made up of two pieces of channel iron placed back to back, securely riveted together with a spacer between them. The channel irons are separated slightly by the spacer, which allows room for two bolts, which are formed into a hook at the top. These are hooked over the main frame work of the Ford chassis and the ends of the channel iron project out on either side under the running boards. Two extra pieces of board are furnished, which fit underneath the running boards for a distance of about 36 inches and when the nuts on the bolts which hook over the frame are tightened this body brace forms a perfect support for the running boards and binds the frame work and body of car together, thus stopping vibration. Prompt deliveries.



Manufactured by the Metal Specialties Manufacturing Co., Chicago, Ill. Price, $3.50.



The Defender Thief Proof Ignition Lock for Fords has been patented in the United States and Canada, all claims for its special features being covered, which include the grounding device, the method for locking the casing over the Ford switch, as well as the idea if locking the coil box. The makers are in a position to make prompt deliveries and will continue to do so throughout the fall and winter.

Manufactured by the Defender Auto Lock Co., Marquette Bldg., Detroit, Mich. Write for prices and literature.

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The Waltham Model O Truck Clock is specified by the United States government to run war trucks on schedule time. This clock will keep accurate time all of the time because it is built to withstand



climatic conditions and the shock of travel over rough roads. It has two main springs and the radium dial and hands are plainly visible on the darkest night. It is wound only once in eight days at the flash of a red signal on the dial. The United States government, who recently purchased 10,000 trucks for military purposes, specified that they must be equipped with this model clock.

Manufactured by the Waltham Watch Co., Waltham, Mass. Write for prices and literature.

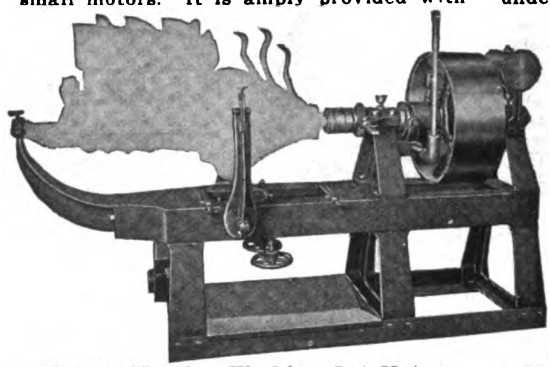
Nazette Connecting Rod Aligning Fixture is an aligning fixture for testing the alignment of new and used connecting rods for Ford engines. It is conservatively estimated that 50% of new rods are not true, and 97% of the rods in engines which have been overhauled are out of alignment. This condition invariably causing a knock which many a mechanic has looked for but could not find. The pins in the tool are made of high carbon steel, double heat treated, hardened and ground. The large pin is accurately fitted into steel bushings, which are also hardened and ground. Immediate deliveries.

Manufactured by the Nazette Manufacturing Co., Eldora, Ia. Write for prices and literature.

The White Valve Grinder is held in place by the operator with one hand, while with the other hand he operates the slide handle, giving the grinder a reciprocating motion and gives the valve a perfect seat free from ridges. The slide handle delivers the power over the center of the tool and there are no cranks to turn, no side gears, no bows to pull, all of which attachments for driving always serve to pull power off center of a valve. This tool is light, strong and durable and will grind the valves of any car, and in many cases will grind valves where an ordinary valve grinder cannot be used. This tool has two small attachments on the lower end for valves that are either drilled or slotted and with its swivel attachment it is easy to get at the Ford valves under the dash. Orders filled promptly.

Manufactured by the White Manufacturing Co., South Bend, Ind. Price, $2.50.

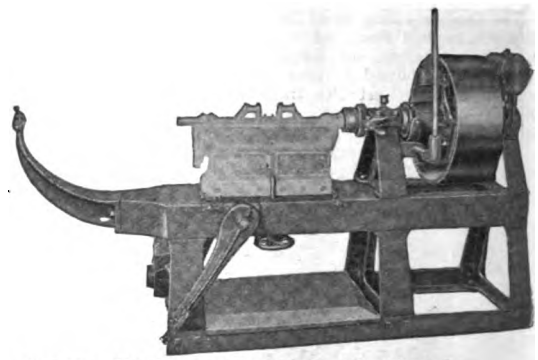
The Nazett Combination Burning-In and Work Out Machine will permit the average mechanic with a limited experience to burn-in all the main bearing and connecting rod bearings of a Ford engine in one hour's time and have a better job than could otherwise be obtained in several hours time. The machine is designed to be operated by a minimum amount of power, as most shops are equipped with small motors. It is amply provided with



Nazette Machine Working Out Motor.

adjustments, provision being made for raising and lowering the cylinder block to allow proper alignment by means of positive and quick adjusting blocks, which slide in accurately milled grooves in the main bed plate. An expanding clutch is used with hard wood friction blocks controlled with turn buckles. Bronze shoes are used in the clutch throw out collars.

To test the tightness of the bearings during the burning in operation the knurled handle clutch lever is removed from its socket and inserted in the socket



Nazette Machine Burning-In Bearings.

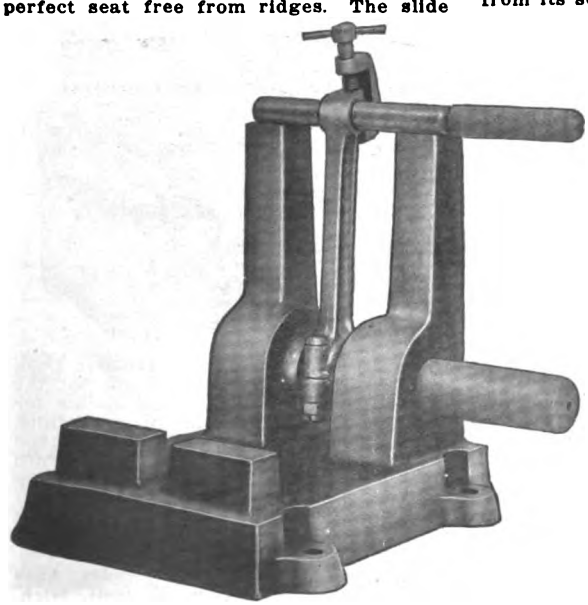
provided on the clutch arm, which enables the operator to turn the crankshaft by hand. It is not necessary to remove the cylinder block from the machine to tighten bearings or inspect same, as this may be done while the machine is running. Openings are provided in the main bed plate through which the valves are free to operate and permit the easy replacement of pistons. In fact it is not necessary to remove the block from the machine until it is ready to be bolted to the crank case. The heavy flywheel when under motion helps to maintain a more constant speed with a minimum amount of power.

To convert the machine into a workout machine it is simply necessary to raise the two side arms, lock them into a vertical position and place the assembled engine into position. Convenient adjustments are properly provided for to align same. It is very essential to work the engine for a short time after it has been overhauled and this test will enable the mechanic to discover such defects as piston slaps, noisy timing gears and oil leaks. The machine is provided with brackets to attach the regular Ford coil box. A gasoline tank is equipped to connect the carburetor. Prompt deliveries.

Manufactured by the Nazette Manufacturing Co., Eldora, Ia. Write for prices and literature.

Genolite (standard six volt system) gives the Ford a constant and sure head and tail lights while running or idle. This system is easily installed as no machine work is involved. It is operated by a patented flat belt, positive and guaranteed generator drive with minimum wear. The lighting switch is conveniently located on the steering post with two positions—full touring and dim. This system can do double duty. In addition to furnishing lights it will give you ignition for your engine, two sources of current always available—one battery and one generator. Prompt deliveries.

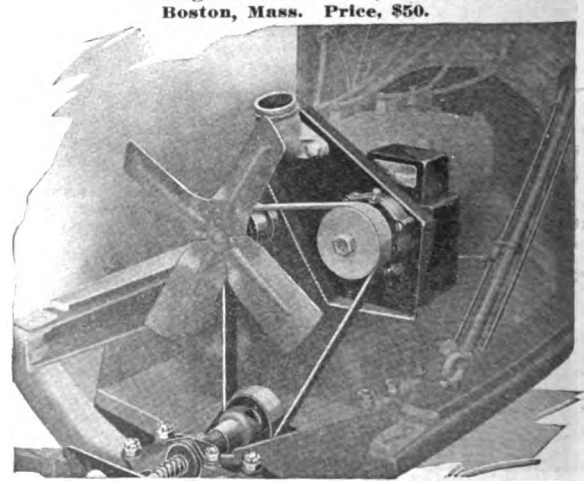
Distributed by automobile division, Pettingell-Andrews Co., 100 Brookline Ave., Boston, Mass. Price, $50.



Nazett Connecting Rod Aligning Fixture.



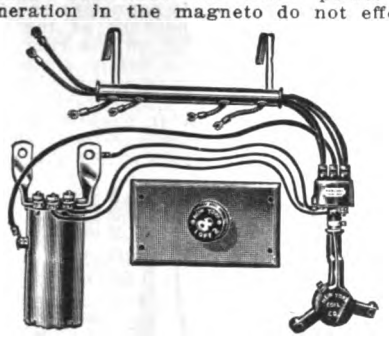
White Valve Grinder.



Genolite Lighting System for Fords.

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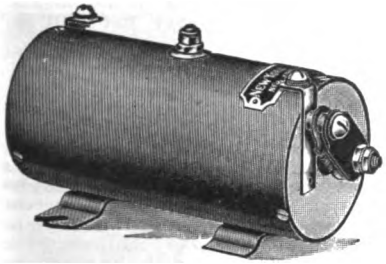
The Vibrator-less Coil Ignition System for Ford cars consists of a timer distributor unit, which is designed for mounting on the front of the engine and driven from the present camshaft projection. The distributor unit is similar to the conventional high-tension distributor, while the timer, or breaker box, is so arranged that with every break in the circuit a shower of sparks is produced by the coil, which is mounted on the engine. Current for the system is taken from the Ford magneto, and such is the construction of the breaker box that the "dead" points of generation in the magneto do not effect



its working. This system is said to work equally well either on dry cells or storage battery.

Manufactured by New York Coil Co., 338 Pearl St., New York, N. Y. Price complete, $22.

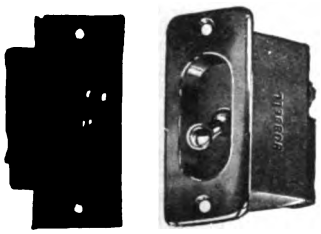
The New York Transformer Coil is interchangeable with any supplied on all modern battery ignition systems. They produce a hot flame at all engine speeds on a minimum amount of battery energy. Operating on very low voltage they mean getting away from starting troubles that have been attributed in many cases to the inability of coils to supply a sufficiently powerful spark at the instant of starting, as at this time the starting motor's drain on the battery is so heavy as to reduce



the voltage in many instances to four volts or less. The condenser is of the proper construction to insure long life of contact points in the distributor.

Manufactured by the New York Coil Co., New York, N. Y. List price on all models $9 each.

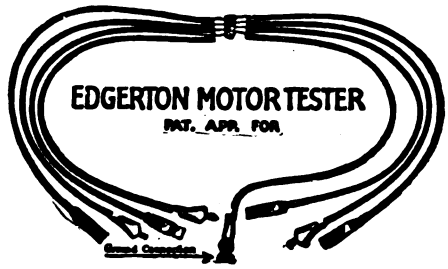
The Hubbell Toggle Switch is quick to work, slow to wear and drops instantly into place and will quickly break the con-



nection with a flip of the lever. It is easily installed upon the dash and requires no complicated movement of the fingers to send it into action. With the handle up the current is on and with the handle down the current is off, making the switch fool proof. All types are made, meeting the regular standard and special switch requirements. Can meet demands for delivery.

Manufactured by the Harvey Hubbell Co., Inc., Bridgeport, Conn. Write for prices.

The Edgerton Motor Tester is for use in determining if all the cylinders of an engine are working properly and are each furnishing an equal amount of power. It



consists of a number of secondary wires which are connected by special easily attached clips with the spark plugs of all but one cylinder. Another wire from the tester is grounded to the engine base, thereby cutting out all but one cylinder. It is then an easy matter to find whether that particular cylinder is running smoothly. By altering the wire arrangement each cylinder may be tested in turn. Jobbers and dealers can obtain prompt deliveries.

Manufactured by R. G. Edgerton & Co., Suffolk, Va. Prices ranging from $2 to $9.50 according to number of cylinders and type of tester.

The B-W Ammeter has a case of drawn brass finished in either bright nickel or black rubberoid. It is supplied in either surface or flush types. The glass is held



in place with a special baked cement, which makes it waterproof, and is further reinforced with a wire locking ring, which eliminates any chance of the glass working loose. The movement is said to be practically vibrationless, that is, not affected by engine or rough road jars. It is of the permanent magnet iron vane type and is not affected by short circuits. The scale is of the usual etched type and several different finishes are optional.

Manufactured by Ballman-Whitten Manufacturing Co., 4060 Forest Park Blvd., St. Louis, Mo. Write for prices.

The B-W Magneto Tester makes it possible to test Ford magnetos without removing the magneto from the engine and it constantly checks up and indicates any trouble. The tester consists of a reactance coil and an alternating current ammeter, all mounted in a neat wooden case. The scale of the tester is calibrated to



show the proper strength of Ford magneto upon any model. The tester serves its greatest purpose when the engine is on the bench. It enables one to get the magneto perfect before reassembling the engine in the chassis. This is done by grounding one of the leads of the tester to the engine and holding the other lead to the contact of the coil frame with the fingers. The other hand revolves the flywheel. This can be done fast enough so that the tester will give a steady, accurate reading. Other tests can be made quickly and accurately by running the engine at any moderate speed, without disassembling, and the tester will indicate the exact condition of the magneto.

Manufactured by the Ballman-Whitten Manufacturing Co., 4060 Forest Park Blvd., St. Louis, Mo. Price, $10. Substantial discount to dealers.

The Jefferson Ford Unit and Combination Tester is designed to facilitate the testing of the Ford coil unit. Speed and accuracy in testing the coils makes the device handy, for in addition to the coil



testing device the tester is fitted with equipment for the testing of automobile lamps, regardless of voltage or candle power, spark plugs of any type, electric horns, signals, coils, etc.

The device is made in two types, the first, No. 28, is designed for connection with the regular alternating current lighting circuit and can be furnished to connect to any commercial voltage or cycle. This voltage is reduced to 12 by the combination tester, which is the minimum voltage generated by the Ford magneto.

The second type, No. 30, is of practically the same type of construction, but designed for operation on a six-volt storage battery or four dry cells.

The top of the unit is fitted with both a single and double contact lamp socket for testing light globes; a flexible spark plug testing rack; an adjustable spark gap and a contact button. Upon the end of the device are mounted two terminals, to which may be connected leads for general circuit testing and trouble finding.

Manufactured by Jefferson Electric Manufacturing Co., 426-430 South Green St., Chicago, Ill. Price for No. 28, $8; for No. 30, $6.

A Double Outlet Y Plug Socket has recently been placed upon the market. Unlike the straight plug socket this plug is made in the Y shape, converting a single



outlet into a double socket. By its use the owner converts his single dash lamp for two purposes at the same time, for one side of the plug may be used for spot light and the other side for an inspection lamp, regular dash lamp or cigar lighter. It has a standard Edison type plug connection at one end, which can be plunged into any dash lamp socket and is neat appearing with the exposed parts nickel plated. It is made in double contact, single or double to single contact.

Manufactured by the Metal Specialties Manufacturing Co., Chicago, Ill. Write for prices.

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The Shaler Roadlighter, in the opinion of motorists who have used it, does not owe its value so much to the fact of its compliance with anti-glare laws as to the fact that with it they can drive without annoyance or danger from the blinding headlamps they always meet on night trips.

Roadlighters take the waste portion of the light, which ordinarily shoots upward above the headlights, and concentrates it on the edge of the road. The effect is the same as using a spotlight on each side of the car in addition to the usual penetrating beam from the head lamps. With this sort of illumination one can see the road right through the glare of headlights he meets and turn out to pass with the same confidence he would in the day time.

While the Roadlighter is approved in every state where approval is required, it is not merely a means of complying with the law, but a protection against drivers

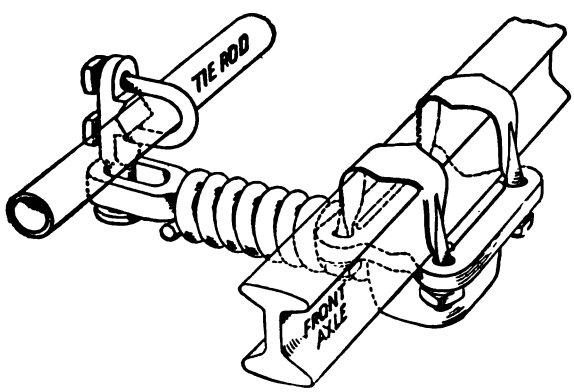


who ignore the law. No glare is produced even when the largest bulbs are used. The road is illuminated from fence to fence. The distance light is intensified. Fog penetration is secured without discoloration of light.

Recent tests under the New York state law permit Roadlighter to be used with maximum candlepower bulbs permitted by the law, which are of 24 candlepower. Texas tests, where no maximum is specified by law, permit 40 candlepower bulbs to be used with the Roadlighter, and these lamps are the largest commercially available Orders for Shaler Roadlighters are being filled promptly.

Manufactured by the C. A. Shaler Co., Waupun, Wis. Prices, Ford size and smaller, $2.75; larger sizes, $3.50.

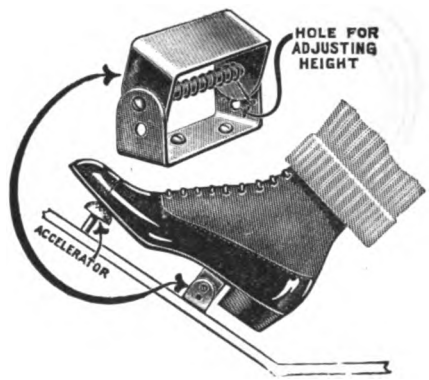
The D. & O. Anti-Wobbler is a simple, substantial device for preventing the wiggle and jiggle of the Ford steering wheels. It is easily attached to the center of the front axle in a few minutes and the makers claim it to eliminate driving



accidents by holding the front wheels true at all times, thus preventing loss of control.

The G. H. Dyer Co., Cambridge, Mass. Write for price and literature.

The New York Foot Supporter was designed to overcome the great amount of leg and muscle strain in operating the accelerator over rough roads, for every



jar or jolt is transmitted through the foot and has its effect upon the action of the engine. As the illustration shows it is attached to the footboard in such a manner as to support the weight of the foot upon an adjustable hinge. Two screws secure the device and once installed the position is always correct.

Manufactured by New York Coil Co., 338 Pearl St., New York City, N. Y. Write for prices.

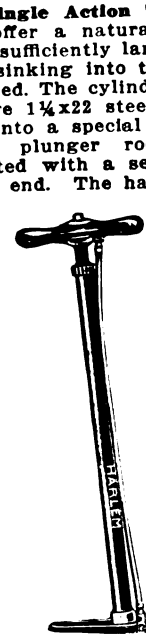
Dutch Brand "2 in 1" Tread Filler, is a liquid rubber that is injected in tread cuts, briuses or gashes in tires, and which closes them against the action of the elements and to oil, sand and other foreign matter that tend to enlarge the wounds and cause the fabric to rot. It requires but a moment to apply the filler and no cement is needed. It meets the demand of the times for tire conservation



by supplying a means of quickly and easily repairing all cuts and injuries immediately, and permitting them to give service throughout their allotted mileage. It is put up in 1x6 inch collapsible tubes, packed one dozen in a box—the container being designed for counter display.

Manufactured by Van Cleef Bros., Chicago, Ill. Price, 35 cents a tube.

The Harlem Single Action Tire Pump is designed to offer a natural pumping angle and has a sufficiently large base to prevent it from sinking into the sand or mud when operated. The cylinder is made of a heavy gauge 1¼x22 steel tube and this is screwed into a special collapsible cast base. The plunger rod is extra heavy and is fitted with a selected Kip cup at the lower end. The handle is re-



inforced and extra large. It is finished in black enamel and nickel.

Manufactured by the Judd & Leland Manufacturing Co., Clifton Springs, N. Y. Price, $2.75.

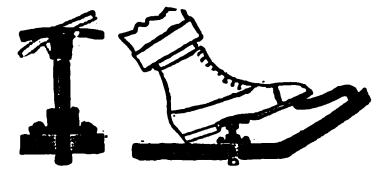
The Inland Piston Ring is of the concentric type with the cut extending half way around its circumference, which feature equalizes the radial pressure of the ring against the cylinder wall and at the same time prevents any leakage through the cut in the ring. The cut is made at a very acute angle with the circumference and is entirely closed. There is a small slot in the ring at each end of the cut, located diametrically opposite to each other. With this arrangement only a small amount of gas will enter the slot and pass under the ring, but it cannot escape from the ring groove, because at the point where the bottom slot on the ring is located the piston bears firmly against the cylinder wall and every possible passage is closed to the gas. This patented design of the Inland gives it greater strength and wearing qualities and it is claimed that it will wear into a cylinder in a few



revolutions of the motor, showing perfect contact and equal wear at all points. Deliveries can be made promptly and in any quantity.

Manufactured by the Inland Machine Works, St. Louis, Mo. Prices $1.25 to $1.75 on sizes from 2 inches to 5⅞ inches. On six-inch sizes and over list will be furnished upon request.

The Adjustable Accelerator Foot Rest fastens to the floor or footboard of the car and serves as a support for the foot in the operation of the throttle or accelerator pedal, enabling the operator to maintain constant and even pressure. It serves as a guide to the foot in reaching



for the accelerator pedal and incidentally relieves the strain on the muscles of the leg which otherwise would have to be kept under tension.

Manufactured by the Rich Manufacturing Co., 1777 Broadway, New York City. Price $1.50.

Rico Ford Pedal Covers are made of live pliable rubber and are attached to a metal plate having eight prongs, which can be bent around the pedal with the

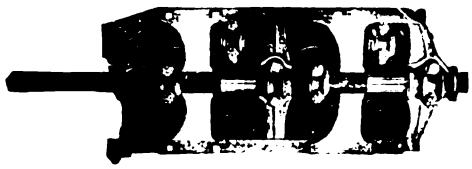


fingers. This fastening is rigid and will not work loose. No tools are required in fitting the covers as there are no holes to be drilled or bolts used. These covers fit all Ford models.

Manufactured by the Rich Manufacturing Co., 1777 Broadway, New York City. Price, per set of three, 75 cents.

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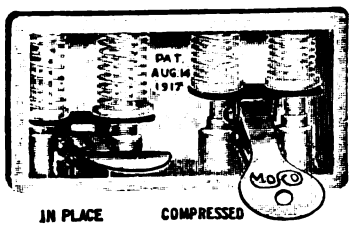
The Dyer Bearing Reamer greatly facilitates the work of fitting main and connecting rod bearings of a Ford engine. The tool leaves a smooth, glassy finish to the bearing surface. The reamer has leads of .004 of an inch at the end of each fluke and is held in line by two adjustable



bearings, which are bolted to the crank case while it is being used. It can be seen from the illustration that by the employment of this tool the lining up of all the bearings is fully assured. Deliveries in one week up to 12 reamers.

Manufactured by the G. H. Dyer Co., Cambridge, Mass.

The Mosco Valve Spring Compressor for Fords eliminates what is usually a troublesome operation, viz., the compressing and removing of valve springs. By using this simple device springs can remain in position until the grinding of the valve is completed. The compressor is placed in position as shown in the left of cut, pushing it back against the cylinder wall, making sure that the tongue which hangs down is over the edge and resting in the channel, then the handle is pushed down as far as it will go. This opera-



tion compresses two valve springs at one time and permits removal of the pins. If the pins are crosswise the valve is turned until they are in the proper position to pass through the slots in compressor. After the valves are ground the operation is reversed. The compressor is made of heavy pressed steel. Immediate deliveries from stock.

Manufactured by the Motor Specialties Co., Waltham, Mass. Price, 50c.

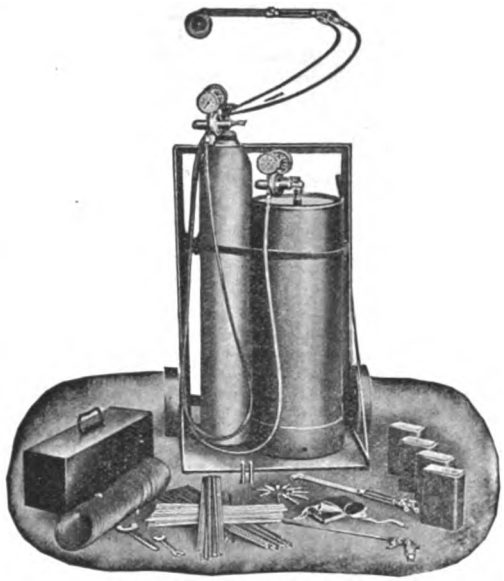
The Socket Wrench Set No. 489, herewith illustrated, consists of a ratchet socket wrench with a ¾-inch hexagon socket (which may be obtained separately) and four extra sockets fitting it. These extra sockets have ⅝, 11/16, 13/16 and ⅞-inch hexagon openings. The ratchet socket wrench has a seven-inch black enameled iron handle and a very strong ratchet that can be used for either right or left hand work. The lignumvitae head runs on ball bearings. Each set is



packed in a strong and attractive hard wood box.

Manufactured by Goodell-Pratt Co., Greenfield, Mass. Price of set, $5. Price of socket wrench No 419 with ¾-inch hexagon socket, $2.50.

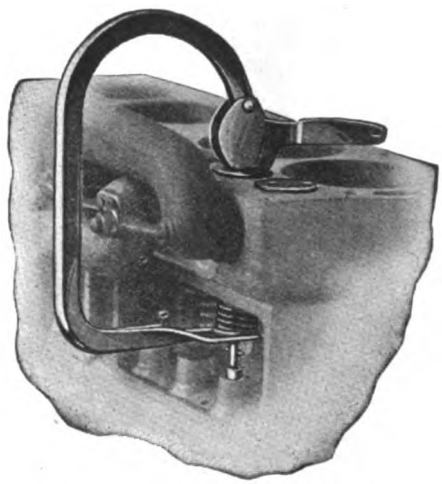
The Dyer Welding, Cutting and Carbon Removing Outfit has two utilities included, that of welding and cutting by the oxy-acetylene process and of removing carbon from the combustion chambers and cylinders of engines. With this apparatus the garage man and repair man can quickly and satisfactorily do all kinds of brazing, welding of broken parts, frame straightening and many other things requiring the use of a welding outfit. The material used in this outfit is of the highest grade. The regulators are strongly built and accurate. The Dyer Co. uses the United States Gauge Co.'s gauges, and the hose used is of extra heavy five-ply fabric. The outfit includes a truck made of the best grade of boiler plate strongly welded. The torches are



simple in construction and easily handled, being of light design and highly efficient. The welding torches cannot back-fire under any circumstances and can be operated to a low enough acetylene pressure to practically empty the gas cylinders. Prompt deliveries on any of the apparatus or complete outfits.

Manufactured by the G. H. Dyer Co., Cambridge, Mass.

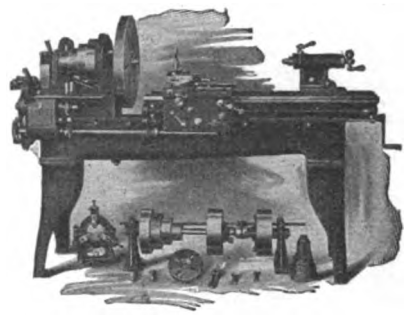
The Beardsley Double Acting Valve Lifter is a time saver, for it removes and replaces Ford valves in less than a minute and in other cars in half the time of other valve lifters. The foot of the device is simply shoved under the spring washer and the cam lever pushed down, which action holds the valve down and



lifts the spring up, giving more room to remove and replace the valves quickly. Sold under guarantee to give satisfaction. Prompt delivery.

Manufactured by the Loomis-Beardsley Co., 1112 Mt. Vernon Ave., Columbus, O. Patented. Price $1.50.

The Sliding Extension Gap-Lathe is capable of handling a wide range of work. It is provided with six quickly changed gear feeds and an extra large spindle. All the gears are covered with safety guards. The bed of the lathe is well

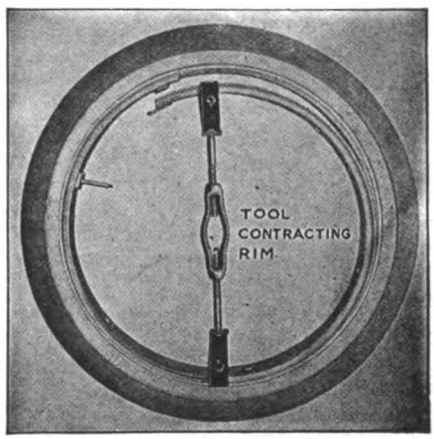


braced and accurately proportioned throughout. The top sliding bed and main bed are planed full length and fitted together with dove-tail construction. A screw and crank at one end draws the bed back when it is desired to widen the gap between the centers. Fair deliveries.

Manufactured by the Barnes Drill Co., 814-30 Chestnut St., Rockford, Ill. Prices, 5½ foot lathe, $650; 7½ foot, $700 f. o. b.

The Mosco Tire Rim Tool shown in the illustration is a handy accessory for the car operator using a machine equipped with split rims. This tool is designed to be hooked over the rim. When so applied and the turnbuckle turned the rim is opened, making the replacement of a tire an easy matter. This tool may also be used for expanding the rim after the tire is applied by reversing the process, the untwisting of the turn buckle exerting sufficient pressure upon the rim to expand it. Reasonable deliveries.

Manufactured by the Mosco Specialties Co., Waltham, Mass. Price, $3.



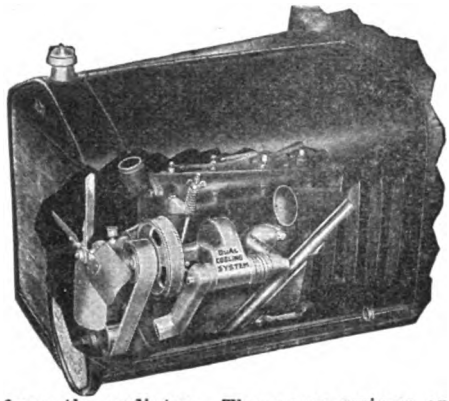
Permatex Heat Resisting Gasket Cement is an extra heavy preparation compounded for use on cylinder heads, carburetors, manifolds, crank cases, gear cases, spark plugs and pump gaskets. It has no harmful action on cardboard, paper, leather, rubber or asbestos or metal, and it is impervious to gasoline, kerosene, oil and water. It is applied in a thin coat to both sides of the gasket just before the gasket is put into place. Prompt deliveries are assured for the next 12 months.

Prepared by Constant A. Benoit, Brooklyn, N. Y.

New Literature on Gasoline Hose. The bureau of standards, Department of Commerce, U. S. government, in a recent report comments on the leaks in valves and piping used for conveying gasoline. Of special interest in this connection is the illustrated literature just issued, for free distribution, by Metal Hose and Tubing Co., Brooklyn, N. Y.

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Dual Cooling System for Ford Cars consists of a centrifugal force circulating pump with a capacity that will not allow the water to remain in the cylinder block long enough to come to the boiling point, also a large ball bearing fan that supplies enough air to carry away the heat



from the radiator. The pump swings on the water line, which gives a proper adjustment to both the fan and the pump belt at all times. There being separate adjustments for each, which are automatically taken up by the spring belt tighteners, and when further belt adjustments are necessary this can be done without the use of a wrench. Prompt deliveries.

Manufactured by the Dual Manufacturing Co., 1202 Hennepin Ave., Minneapolis, Minn. Price, $25.

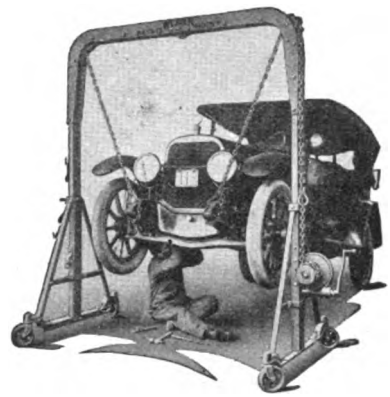
Union Tool Chests enable the mechanic to keep his tools for instant use in having them always at hand filed according to their adaptability to the job on hand. The cabinet is made in various types and the handle is covered with heavy, genuine leather and has heavy steel wire through the center. Loops secured by rivets carry the weight and cover the ends of the handle which is attached to the chest with heavy cotter pins, absolutely preventing its being pulled out of the loops. The frame is thoroughly seasoned, properly kiln dried selected stock, quartered white oak in quartered oak chests. Plain



oak in G chests and basswood for covered chests. The drawer sides are of cherry or maple. The fronts of oak and mahogany. The bottoms of three-ply veneer. The hardware is extra heavy, with polished nickel finish. The lock of Sargent & Greenleaf with 100 key changes, of solid brass and bronze, with two milled slot, flat, rust proof keys. Fair deliveries.

Manufactured by the Union Tool Chest Works, Rochester, N. Y. Price, $17.50.

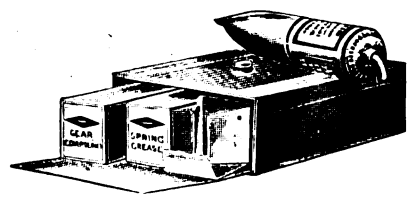
The Weaver Auto Hoist has a much greater range of application than the ordinary block and tackle. It can be run into position over a car in a crowded shop without requiring more than 12 to 14 inches space on either side of the car. The frame is so designed as to permit the height of the arch to be increased approximately 12 inches, allowing the uprights to be raised to the desired height in the braces on either side by means of the



chain hoist. The increased height enables the hoist to raise the rear end of a limousine or a touring car with the top up, for removing the rear system. One chain of the hoist may be carried over the pulley in the center of the frame for performing work which can be handled to better advantage by a single suspension than by a double suspension from each corner of the frame, as shown in the illustration. The hoisting mechanism is operated by worm drive, which is absolutely safe and positive. There are no gears or ratchets to slip or break and allow the load to fall.

Manufactured by the Weaver Manufacturing Co., Springfield, Ill. Write for prices and literature.

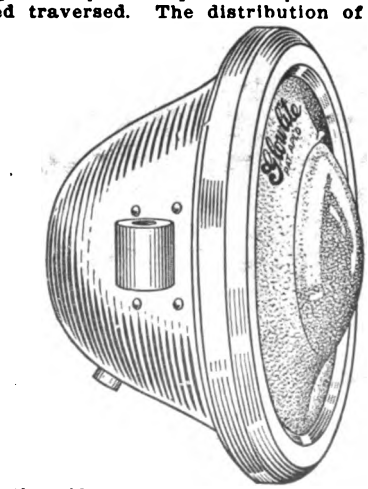
Grease-in-Tubes is the clean, handy, ready way to use grease. It is economical, as there is no waste—fresh grease always being ready and usable to the



last drop. This grease is put up in three tubes in a carton called "The Lincoln Highway Kit" and consists of one tube of cup grease, one tube of spring grease and one tube of gear compound. This grease is of the best grades obtainable and is always ready for instant use without the usual soiling of hands and clothing in inserting it.

Manufactured by the Crew Levick Co., 111 N. Broad St., Philadelphia, Pa. Price, $1 a kit; 35 cents a tube.

The Glowlite Lenses, the manufacturers claim, are the highest scientific application of the safety idea in automobile headlighting. There is no concentration of light in spots or patches upon the road bed traversed. The distribution of light



to the sides of the car, even almost directly at right angles to the plane of the lamps, is decidedly more uniform and more powerful than is the usual type of headlight. This is an important advantage, since it permits the driver to see ruts, rocks, ditches, etc., very clearly, as well as enabling him to read direction signs and mile posts along the road.

Manufactured by the Glowlite Co., Columbus, O. Price $2 per pair, any size.

Pontoklene is a product of the well known Du Pont Chemical Works and is used for removing grease, oil or tar from the motor car, while at the same time restoring the original polish of the car without rubbing. It is also used for cleaning engines and is superior to gasoline

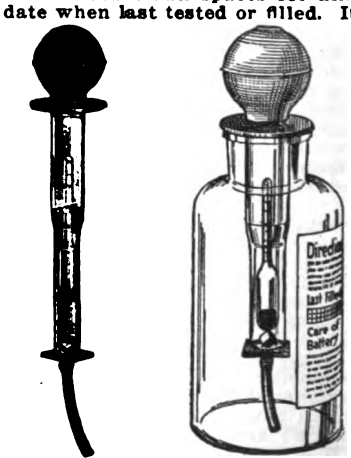


for that purpose. In cleaning the automobile Pontoklene will save much time and labor, particularly where many cars are handled, as it will remove tar as readily as water washes away dust without injuring the finish of the body.

Distributed by E. I. Du Pont De Nemours & Co., Wilmington, Del. Prices: ¼ gallon, $1; ½ gallon, $1.50.

The WorkRite Hydrometer Outfit consists of a high grade hydrometer fitted in a glass jar for holding distilled water or pure rain water. It can readily be seen that this outfit would be very handy for use around either a public or private garage, for filling and testing storage batteries.

The WorkRite hydrometer is fitted with rubber collars at each end, which prevent the glass from striking and breaking if accidentally dropped. The large collar at top acts as a cover for the water jar and the square collar at bottom prevents the instrument from rolling if placed on an uneven surface. The label on bottle contains numerous blank spaces for filling in the date when last tested or filled. It also



contains complete instructions for the care of the battery in both winter and summer. Immediate deliveries.

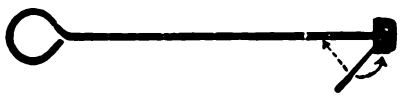
Manufactured by the WorkRite Manufacturing Co., Cleveland, O. Prices for the combination outfit is $1.50, and for the hydrometer only $1.

Waxit is a cream white emulsion for cleaning and polishing all varnished and enameled highly finished surfaces. It is not a varnish solvent and if spilled on varnished surfaces can be wiped up without injury to same. Contains no injurious or inflammable ingredients and will not injure the hands. It is applied to an automobile with a piece of clean cloth or cotton waste just as one would apply soap and water, after which it is carefully wiped off with a piece of dry cheese cloth, leaving a smooth, dry polish, to which the dust will not adhere.

Manufactured by the Waxit Manufacturing Co., 2424-26-28 University Ave., S. E., Minneapolis, Minn.

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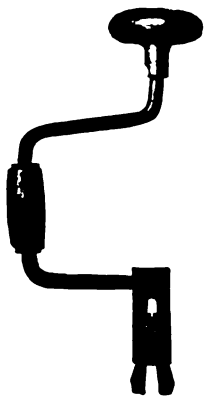
The Fawsco Combination Wrench is a combination gasoline gauge, oil cock wrench and cleaner, and the claim is made that it will not only measure the gasoline in the tank, but provide the only sure means of learning whether there is oil in the crank case, as the pin will prove if the oil cock is stopped up or the oil ex-



hausted. It is made of nickel plated, coppered, Bessemer steel rod, with a very high class finish. They are put up in complete packages for the convenience of the trade and dealers are furnished with a very handsome counter display card, upon which is mounted one of the tools, which helps considerably in their sale. Prompt deliveries.

Manufactured by J. H. Faw, Inc., 37 Warren St., New York City. Retail price 45 cents.

The Utility Universal Rim Wrench is light, compact and fits easily into the tool box without folding. The brace is nickel plated, the tube contains jaws fin-

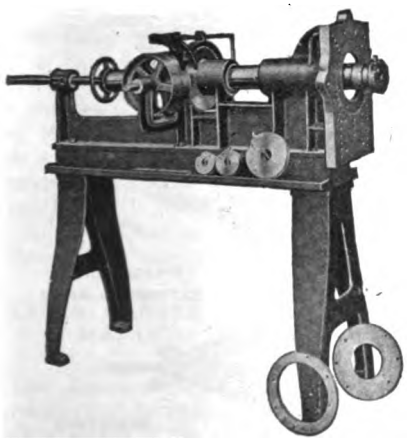


ished in black enamel and the handle corresponds.

Manufactured by the Hill Pump Valve Co., Chicago, Ill. Price, $1.75.

The No. 5 Marvel Reboring Machine is practically automatic in all its working parts. After the cylinder is centered on the face plate the automatic feed release can be set to the cylinder depth and the operator can perform other work while the machine is reboring.

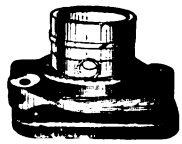
With the present shortage of man power this labor saving machine is meeting with a big demand and the manufacturers state that in order to obtain



prompt deliveries orders should be booked at once.

Manufactured by the Marvel Machinery Co., 1301-1307 South Third St., Minneapolis, Minn. Write for prices and descriptive literature.

The Storm Piston Vise for 3¾-inch (Ford size) pistons, holds the piston firmly and in a convenient position for working. The old method of handling a piston in a common vise has been largely by gripping the connecting rod with the piston attached Any attempt to grip the piston itself would not only injure the machined surface, but also press it out of round. Therefore the ordinary bench vise is poorly adapted for piston work It is injurious to the connecting rod, for stress is applied upon it when tightening the wrist pin bolts, which results in distortion of twist with considerable faults in alignment. But more than that it is inconvenient, awkward and interferes with other work at bench.

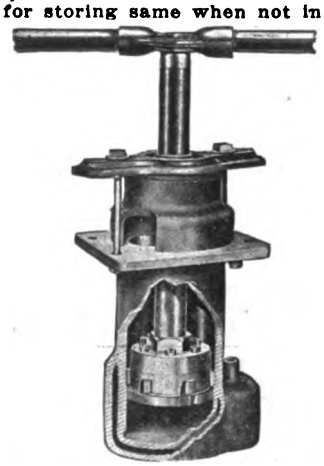


This new Storm Vise grips the piston as it should. Its jaws conform to the shape of the piston and fits it. They are lined with a soft metal and prevent damage to both the piston and the rod. The piston is quickly clamped or released by a single turn of the hand. Quick adjustment is provided for different oversizes. The piston is gripped firmly and cannot be dislodged by the effort employed with the wrench or other tools.

Manufactured by the Storm Manufacturing Co., Thompson, Ia. Price, $10.

The Storm Reboring Machine herewith illustrated is made in various capacities. They are portable machines, suitable for the average garage and repair shop conditions. They are comparatively low in cost, easily operated by men of little shop experience. They are filling a long felt want for a reliable tool for renewing worn and scored cylinders without loss of time and without the necessity of sending them away.

The machines are provided with main cutter heads, each provided with six cutter blades. A single cutter adjuster operates the blades, which may be set to cut any desired oversize and to fit pistons already furnished. The head is fed gradually to the work and is provided with upper and lower supports, which also center the machine. It is adapted for hand operation. A convenient case is provided for storing same when not in use.

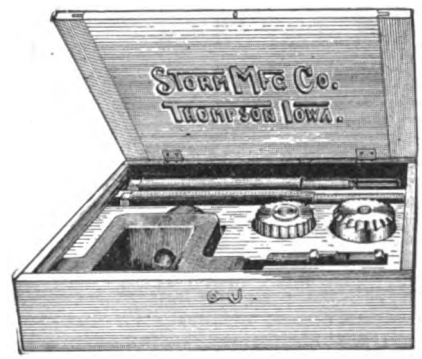


Manufactured by Storm Manufacturing Co., Thompson, Ia. Prices: No. 214, standard large machine, 2⅝ to 5 inches, $115; No. 212, standard machine, 3 11/16 to 5 inches, $80; No. 213, attachment for No. 212, 2⅝ to 3 11/16, $36; No. 204, machine for Ford, $55; No. 206, machine for Ford and Dodge, $60; No. 210, drill press attachments, extra, with straight shank, $7.30; No. 211, drill press attachments, extra, with taper shank, $8.

The Storm Valve Port Renewing Outfit accomplishes three important things: It enlarges the port, forms a new narrow seat similar to that on a new motor, and produces a new stem guide which, when fitted with valves with 1/64 inch oversize stems makes the entire valve system as good or, in fact, better than on the day it left the factory new.

An upper jig or guide is provided. Emphasis is laid upon this feature, as it is the only way absolute accuracy can be obtained. This jig is secured to the engine block by two bolts which fit into the cylinder head bolt holes and it remains in position until all operations have been completed. Then it is swung to the next post by removing one bolt.

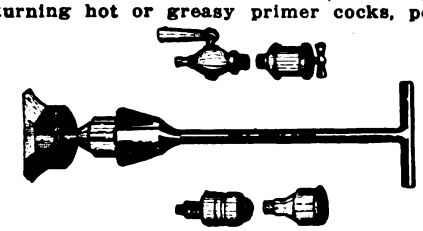
With the Storm device an enlarging reamer cuts away a portion of the old seat, enabling the reseating reamer, which is next used, to cut a new narrow seat. The enlarged port is in itself a good feature, allowing a more free passage of the gases, promotes cooling, permits a somewhat higher speed and greater power. The reseating is accomplished



in practically the same manner as other tools for this purpose, excepting that the upper jig insures absolute accuracy, whereas without this support the reamer is allowed to vary or wobble, due to the unavoidably uneven pressure exerted by the operator, necessitating a much greater amount of grinding to true up.

Manufactured by Storm Manufacturing Co., Thompson, Ia. Net price complete $15.

The Universal Grease Cup Wrench is designed to save time, labor and temper. It fits all sizes and types of grease cups without adjustment. It may also be used for other work about the car, such as turning hot or greasy primer cocks, pet

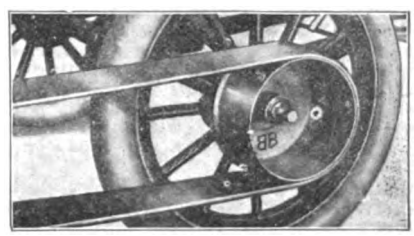


cocks or drain cocks, and it will be found especially convenient for reaching cups and cocks in out of the way places. Immediate delivery is assured.

Manufactured by the Prismolite Co., Columbus, O. Price 75 cents.

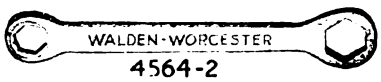
The Bayne "BB" Auto Power Pulley is an ordinary five-inch crown face belt pulley 10 inches in diameter, correctly designed, so that it can be attached to either rear wheel of an automobile by simply unscrewing and replacing the hub cap, and when attached is a perfect belt pulley for transmitting power to any belt driven machinery. Prompt deliveries.

Manufactured by the Bayne Manufacturing Co., Bushnell, Ill. Price, $5.65.

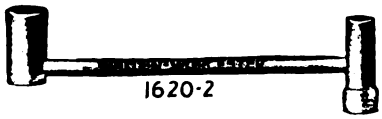


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Walden-Worcester Special Wrenches for Ford Cars have been tried out by garage repair men and Ford owners. They have been found to be most efficient tools —especially useful in getting at nuts and bolts inaccessible to ordinary open-end or monkey wrenches.

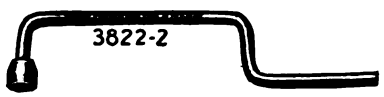


The ratchet wrench, No. 4564-2 with an 11/16 inch hexagonal opening, was particularly designed for use on transmission bands (brake and reverse), Ford car. The opposite end, 15/16 inch, is for use on Champion X spark plugs and slow speed connecting lock. This is a combination tool which has been found to be most serviceable. The price of this tool is $1.20.

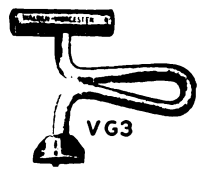


The Triple Socket Wrench, No. 1620-2, is really three wrenches in one. The socket sizes are ⅝ inch and 1½ inch hexagon and 9/16 inch square. This is our new improved "Tomahawk" wrench.

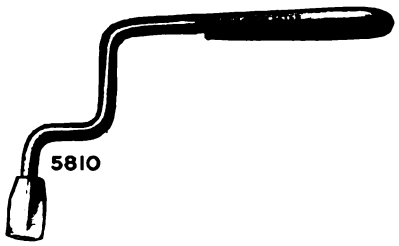
The double-end socket has been designed particularly for clearance around cylinder head bolts and other places. Used on cylinder head, brake and reverse support, cylinder inlet and outlet connections, differential case, drive shaft roller bearing, front spring tie, spring, run board fender, rear axle housing, crank case (lower cover), controller shaft bracket and 9/16 square socket on main bearing bolt head. The price of this tool is 75 cents.



The special type wire handle wrench, No. 3822-2, is used on flywheel cap screws. Ford car; heretofore considered an impossible place for a socket wrench. It is an ugly place for a socket wrench. It is an ugly place made easily accessible. The socket size is 11/16 inch hexagon. It sells for 50 cents.



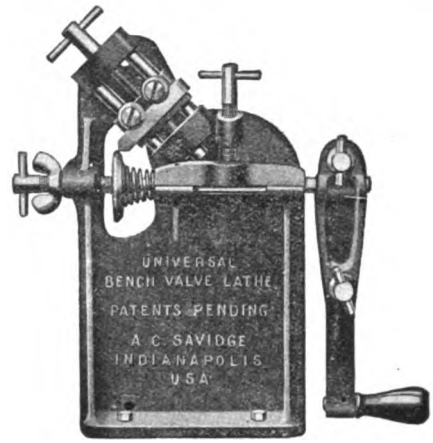
The all-steel wire handle valve grinder No. VG3 has a ⅝ inch bar handle, which swivels on a cone bearing. The socket is shaped to fit valve heads and is fitted with hardened steel pins. The valve grinder sells for 50 cents.



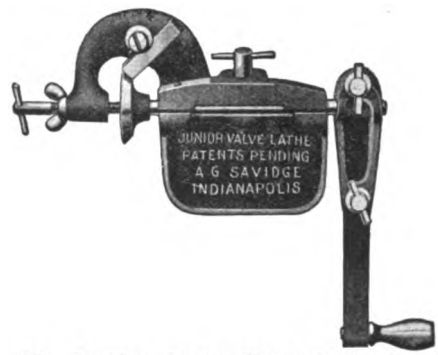
Wrench No. 5810 is a specially designed connecting rod wrench. It fits all connecting rods on a Ford car, including the fourth connection. This is the original design, the first wrench made to reach the fourth connection without removing the engine from the car. It sells for 50 cents.

Manufactured by the Walden-Worcester, Inc., Worcester, Mass. Write for catalogue.

The Savidge Universal Bench Valve Lathe is designed to reduce the time of fitting valves to a minimum. The tool consists essentially of a base to clamp in a vise on which is a stem way for the valve, and mounted above this is a high speed steel cutter that may be set for any



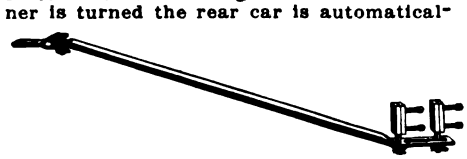
desired angle. The valve is placed in the way with a spring to maintain its position, and a handle is clamped to the stem end and turned. The cutter and the valve are adjusted by feed screws, and any cut can be had with surprising little labor, while the work is absolutely accurate. The tool can be used for any valve with 30 or 45 degrees angle faces up to 2½ inches diameter and 7/16 inch stems.



The Savidge Junior Valve Lathe is intended for use with valves for Ford chassis, having 5/16 inch stems and cast iron valve heads, up to 1¾ inches diameter and with faces 45 degrees angle. Statement is made that this can be operated while held in the hand or clamped in a vise. The operation is practically the same as the Universal tool, but the cutter is fixed and is not fed for the cut. The adjustments are equally accurate and the work is quite as well done. The tool is a size that it may be carried in the kit of the truck or car.

Manufactured by A. C. Savidge, Indianapolis, Ind. Prices, Universal model, $10; Junior model, $5; extra cutters, $1 each.

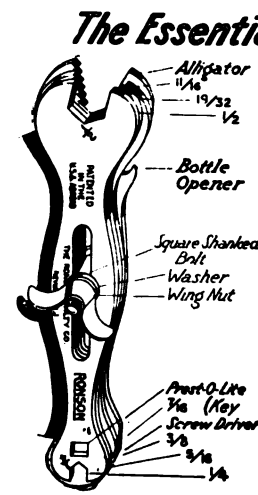
The Dyer Towing Device is a simple arrangement for fastening to the front axle of a Ford car and making possible the towing of the car by another without the aid of a second driver. The device is designed for attachment to the axle and is fitted with a clamp, which is fastened to the steering spindle connecting rod. The other end of the device is fastened to the towing car. When a corner is turned the rear car is automatical-



ly steered by the device. Prompt deliveries can be made in large quantities.

Manufactured by the G. H. Dyer Co., Cambridge, Mass. Write for prices and literature.

The Ronson Wrench combines eight size wrenches in one. A twist of the lock nut releases the size wanted. In addition to these wrenches, a screw driver, a bottle opener and an alligator jaw wrench are contained in the combination. The whole outfit weighs but half a pound, is

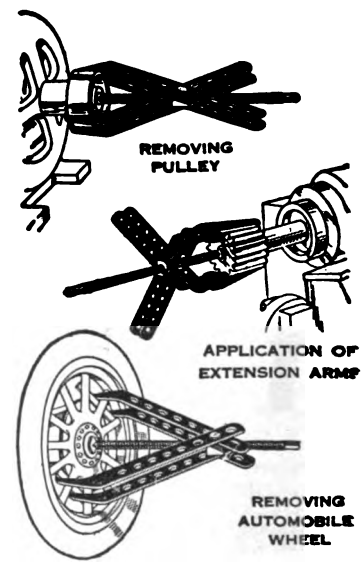


six inches long and ½ inch thick and may be carried in the pocket. Prompt deliveries.

Manufactured by the Art Metal Works, 7 Mulberry St., Newark, N. J. Price, $6.00 dozen. Gross lots (minimum), $66 gross net.

The "Little Giant" Gear and Wheel Puller is made with four puller arms of drop forged steel and has an adjustment range from nothing to 13 inches when "extension arms" are used. The puller arms are so arranged that with the draw screw in place there are four pulling points, so distributed that there is no need for a holding or steadying bar. The puller prongs are designed to give maximum strength, yet to occupy little room. For this reason they may be used for removing timing gears or other gears where room is limited.

This device is handy in removing inside work and for inside pulls. For removing small pulleys or gears a pair of extension arms may be used. These arms are provided with a locking arrangement for fastening to the pulling arms and provide for two pulling points rather



than the four as in the primal attachment Prompt deliveries are assured.

Manufactured by Premier Electric Co., 4033 Ravenswood Ave., Chicago, Ill. Price for "Little Giant," $10. Extension arms, $1 extra.

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JOHNNY AITKEN, RACING PILOT, A VICTIM OF THE INFLUENZA.

The recent death of Johnny Aitken, automobile racer, at Indianapolis, was a shock to that part of the public that has followed automobile speed events. Aitken was a victim of Spanish influenza, and at the time of his fatal illness was in charge of the shop of the Allison Experimental Co. at Indianapolis. He had not been racing for the past two years, had made good progress in the work undertaken after he left the race track, and his friends aver was in excellent position to make a big, assured place for himself in his new work when death came.

There is much comment because Aitken, known as a daredevil driver, who risked his life countless times, should have been a victim of the late epidemic.

Nineteen hundred and sixteen was Aitken's biggest racing season, though he had been a formidable contestant for championship honors before that. In 1916, however, he came very prominently to the front and ended the season a close second to Resta, who was crowned king after the racing season ended. Throughout the season the two were neck and neck for first honors, with the odds in Aitken's favor, and it is generally conceded that his driving gave him a strong hold in the championship, but accidents to Aitken gave Resta the lead which won.

NORDYKE & MARMON WIN THE LIBERTY MOTOR CONTEST.

The Nordyke & Marmon Co., Indianapolis, Ind., won the first honor pennant offered by the United States government to the concern building and shipping 12-cylinder Liberty motors the most rapidly in October. The contest began Oct. 1 and ended Oct. 31. The company made a production record of 225 per cent. of its alloted quota in October. The contests are to be continued each month. Five other firms contested during October.

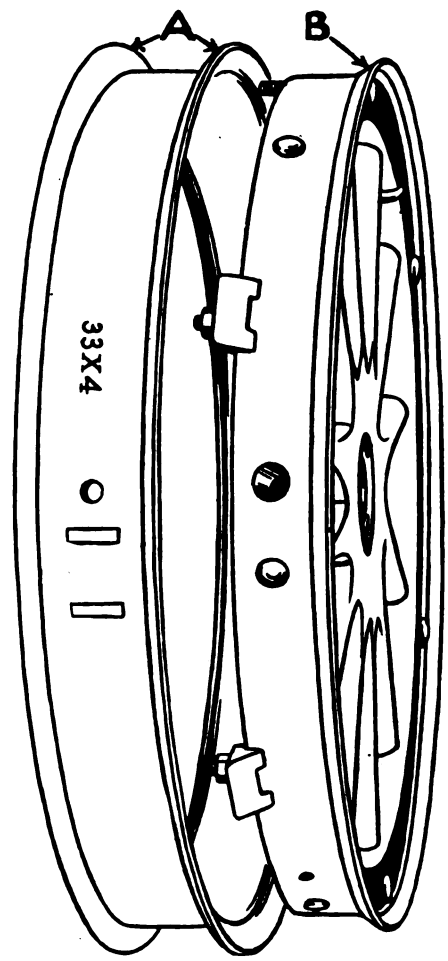
The flag will be presented today at one of the Indianapolis parks. It will remain at the plant of the winner until won by another concern. Among those who are expected to attend the flag presentation are John D. Ryan, Assistant Secretary of War, and Major General W. L. Kenly, Chief of the Department of Military Aeronautics.

AMAZON RUBBER CO. IS MANUFACTURING BIG LINE.

The Amazon Rubber Co., Akron, O., through the purchase of the tire accessory business of the O'Neil Tire and Rubber Co., have greatly extended their line, which now includes the following products: "Amazon" Car Supertires; "Amazon" Ribbed Tread Supertires; "Amazon" Nonskid Tread Supertires; "Amazon" Red Supertires; "Amazon" Gray Supertires; "O'Neil" Pioneer Reliners; "O'Neil" Pioneer Wing Blowout Patches; "O'Neil" Pioneer Lace-On Boots; "O'Neil" Pioneer Cementless Patches.

Riding On Felloe Band Is Very Destructive to Band and Wheel

This warning to motorists is voiced by L. M. Baker, manager of the rim department of the Bearings Service Co. headquarters, Detroit, Mich., who directs the operation of the rim departments of 22 branches and 600 distributing stations of the Bearings Service Co. He declares that motor car drivers generally prefer to remove the easily demountable rims with a punctured tire, and if an auxiliary tire is unavailable, ride into the garage or repair station on the easily damaged felloe band when they should ride on the rim.



Showing Construction of Wheel with Demountable Rim and Points Where Load Stresses Are Taken.

The felloe band, marked "B" in the illustration, is really nothing more than a reinforcement for the spokes and the wooden felloe which holds the spokes together, and is also a connection between the wheel and the rim, according to Mr. Baker, who says that when abused as described, it is generally damaged beyond repair. Mr. Baker, who has been in the rim business almost since the beginning of automobile rim development, says he would like to know how much wasted time and money misuse of the felloe band has cost the motorists of America—"certainly no small amount," he says, "for I see cars being driven every day on the felloe band, and I always know what the result will inevitably be.

"The motorist cannot escape after thus using the felloe band, without sending the wheel to a wheelwright for a repair job that will last about three days, put him to the trouble of taking the wheel there and back and the expense of at least $10—all because the motorist failed to appreciate that the felloe band should not be used to ride on. The wheelwright in most cases will have to shrink a new felloe band on the wheel, for driving on it will bend it out of shape so that it cannot be straightened successfully so as to retain the rim. In some cases such abuse will ruin the wheel and the motorist will be put to the expense of a new one.

"The flange on the felloe band, against which the inner flange of the rim rests, is what the car really rides on when the rim is removed. This is either flattened out straight or bent so that it is not repairable.

"The better thing for the motorist to do in a case where he cannot replace the tire is to replace the rim and drive to the nearest repair station. The rim has two strong flanges (designated by "A") of equal size and in 99 cases out of 100 will not be injured by such use. If the rim is injured the motorist can easily procure a new one without delay, but he will have a far harder time obtaining a felloe band. In our 22 branches the motorist or garage man can always obtain what he wants in this line or from any one of our 600 distributing stations, but there is still the delay and the expense of having it installed. To save trouble remember to put the rim back on.

CARE OF THE COOLING SYSTEM.

The average motorist spends little time in trying to maintain the running efficiency of his car. This is especially true in caring for the cooling system, which is more important than the average motorist thinks, yet it is generally neglected. If the cooling system is not kept clean and free from leaks it impedes the efficiency of the engine and increases its cost of operation.

The Northwestern Chemical Co. of Marietta, O., makers of the Norwesco line of "Chemically Correct" automotive equipment, have issued a 20-page booklet entitled "Care of the Cooling System."

This booklet is illustrated and conforms to its title, giving the motorist many practical suggestions and valuable information, which will assist him in giving proper care to the cooling system. A copy of this booklet can be secured, postpaid, by writing the Northwestern Chemical Co., Marietta, O.

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American Tire Filler Industry Forms Organization

Makers Meet in Chicago to Show Need of Their Product in the Tire Conservation Movement.

The American Tire Filler Industry (Inc.) was organized as the result of a convention of representatives of the principal concerns in this country manufacturing tire filling held at the Congress Hotel, Chicago, Sept. 15-18. There are about 25 different concerns in this country producing fluid, semi-fluid or solid material for filling tubes intended for pneumatic tires, the purpose of the fluid or semi-fluid compounds being to fill punctures of tubes by exudation and retain the filling, and of the solid fillers to afford a sufficient degree of resiliency and yet be free from the delays, inconvenience and expense of tire deflation and inflation, changes and repairs.

The manufacturers of these fillers maintain that while the same ratio of resiliency obtainable with air filled tires is not realized with the use of tire filling, there is sufficient shock absorption to insure the comfort of passengers and protection of freights and to much reduce the mechanical wear from vibration. They maintain further that the insurance against tire destruction from puncture, delays, labor of changes and the reduction of repair cost compensates for any lessened comfort while riding. Statement is made that tire filling will insure a uniform degree of inflation and even wear of tires, that there is little probability of rim damage and the number of tubes required is much less than when air is the inflatant. There is less need of carrying spare casings and tubes, changes are not necessary until shoes are completely worn, and many of the accessories used with tires, such as valves, pumps, gauges, patching sleeves, jacks, etc., are not necessary for either passenger cars or trucks equipped with filled tires.

The convention held open sessions at which were present representatives of the War Department, the American Red Cross, Y. M. C. A., Salvation Army and numerous economy, labor and defense boards. The convention was opened by Franc D. Mayer of the Essenkay Products Co., Chicago, who stated among other things that very large savings could be accomplished by inflating automobile vehicle tires with resilient filler instead of air. He held that the use of filler doubled the life of tires, which meant a saving of 50 per cent. of the cost. Basing estimate on 4,000,000 passenger cars in use in the United States and assuming eight tires a year for each, 22,000,000 tires were needed annually, and at an average cost of $20 a tire this meant $640,000,000 spent yearly for tires for passenger cars, excluding the expense of spare tires, rims, tubes, jacks, pumps, etc. A saving of 50 per cent. would mean $320,000,000.

He further estimated that $260,000,000 is spent for accessories for tires, of which $193,000,000 was for tubes alone. Adding the savings of $320,000,000 and $260,000,000 made a total of $580,000,000, which he believed could be saved in very large part by the use of tire filler instead of air, basing this on 4,000,000 cars, and as a matter of fact the total number of vehicles of all kinds using pneumatic tires considerably exceeds 5,000,000.

One phase dealt with by numerous speakers, some of whom had served on the battlefields in France, was the possibility of equipping ambulances with filled tires to obviate the delays from differing damage that necessitated changes, or driving on deflated casings that was destructive of shoes, tubes and rims, increased the suffering of wounded or sick, and decidedly retarded movement of vehicles.

The conclusions of the convention may be summarized as follows with reference to the use of tire fillers:

(a) Such use reduces the likelihood of ambulances, trucks or officers' cars in the United States army service being delayed under fire or at other critical time.

(b) Such use would prevent delay of munition shipment by trucks.

(c) Such use would facilitate food production and transportation.

(d) Such use would release labor now directed to needless production, obviate waste of labor, costing in the aggregate a large amount of money, and minimize the labor necessary for repairing.

(e) Such use would greatly lessen the demand for rubber for tires and would release rubber now used for other essential requirements.

The convention believed that the government needed tire filler in every branch of its transport service, both in this country and abroad. The convention approved a resolution offering to the government the plants, products and experience of the members of the American Tire Filler Industry, Inc., in conserving life and materials now lost from tire damage or destruction.

The convention elected the following officers for the coming year: President, Franc D. Mayer, Essenkay Products Co., Chicago; first vice president, Frank A. Hager, Universal Tire Filler Co., Portland, Ore.; second vice president, Lee W. Lockwood, Dahl Punctureless Filler and Rim Co., Minneapolis, Minn.; third vice president, W. W. Major, National Rubber Filler Co., Midlothian, Tex.; secretary, C. P. Umstot, Peerless Tire Filler Co., Chicago; treasurer, L. G. Harris, Wolverine Tire Cushion and Accessory Co., Detroit; directors, the officers and J. Wolff, National Synthetic Tire and Rubber Co., New York, N. Y., and C. G. Schwarz, Panama Rubber and Equipment Co., St. Louis, Mo.

LIBERTY STARTING PRIMER.

It seems an amazing fact that thousands of motorists will continue on through a winter season, cranking, adjusting and performing other unnecessary labor to start their engines while there are a number of perfectly practical devices on the market designed to eliminate all this trouble and waste of time. The trouble with these people in coming to a realization of this fact seems to lie with their lack of knowledge concerning the carburetion of gasoline, the most important point in connection with which is that the various particles of the fuel be so broken up that they will mix readily with the air and become instantly ignitable. This latter condition is quickly established by high temperatures, but these are obtainable or exist only after the motor has started and before that time, particularly in winter weather, the engine is so cold that the gasoline going through the ordinary channels of carburetion will not mix to a combustible state for some time with the result that great patience and labor is always necessary to start the engine by cranking.

A device to give a mixture that is instantly ignited when drawn into the combustion chambers has been recently marketed under the name of the Liberty Starting Primer, which is guaranteed to produce instant combustion in turn in each cylinder, on the first compression at any temperature down to 20 degrees below zero. It vaporizes the fuel into suspended combustible molecules, regardless of the intake of air through the manifold of the cylinders.



Showing Application of the Liberty Starting Primer.

This vaporization is produced by a slight quick pressure on a push button on the dash. This operates a high pressure force pump from 150 to 300 pounds, throwing the fuel, gasoline, kerosene or distillate through a patented atomizing nozzle with such terrific force that the manifold and ports are completely filled with suspended vaporized molecules of the highest combustible power. The motor has only to be cranked by hand or by any self-starter, and as it takes in air the current draws the suspended molecules into the cylinder, producing instant combustion in turn, in each cylinder, on the first compression.

The Liberty Primer can be easily installed on any Ford car, truck or tractor in 30 minutes and is furnished complete for installation with all necessary parts and instructions. If the car, truck or tractor is not equipped with a standard Ford carburetor it is necessary to specify the name of carburetor and manifold used, so that the proper connections and instructions to attach will be sent with the order. It comes neatly packed in a corrugated box, weighing two pounds, and shipment is made promptly. The price is $7.

Manufactured by the Liberty Starting Primer Co., 676 Woodward Ave., Detroit, Mich.

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THE 1918-19 EDITION OF THE MODERN MOTOR CAR.

The 1918-19 edition of "The Modern Motor Car," by H. P. Manly, which covers in a thorough and comprehensive manner the care, repair and upkeep of practically every type of automobile, has been announced by the publishers, Laird & Lee, Inc., 1732 Michigan avenue, Chicago, who are distributing the book at $2 a copy.

The new edition has 536 pages, with 225 illustrations, and makes a valuable reference book for the car owner, dealer, garage man or mechanic, as the subjects of construction, care and adjustment of motor car parts, together with shop and roadside methods of trouble location and repair are treated in a simplified style, while information is also given on how to buy, make and use materials and supplies. The latest developments in automobile and repair shop practises are incorporated in the volume, bringing it up to date and covering practically every point which would interest one in most every branch of the automobile trade, as well as making it particularly valuable as student's text book.

Increase In Ford Surplus Over $40,000,000

Balance Sheet as of July 31 Last Shows Total Assets of $203,749,460.

The statement of the Ford Motor Co., filed with the secretary of State of Massachusetts, showing the company's balance sheet as of July 31 last, reveals an increase in surplus of over $40,000,000. The total assets and liabilities of the company as compared with the previous year have also grown enormously, being now figured at $203,749,460, as against $165,975,002 last year.

The statement as filed is as follows:

	July 31, 1918.	July 31, 1917.
ASSETS.		
Real estate....	$37,117,363	$28,180,582
Machinery and equipment....	29,335,982	25,637,959
Material in process	44,522,562	46,762,457
Cash and debts receivable ...	91,471,851	64,619,763
Patent rights..	67,997	66,637
Inventories ...	1,231,906	706,286
Investments ...	1,815	1,314
Total.....	$203,749,460	$165,975,002
LIABILITIES.		
Capital stock..	$2,000,000	$2,000,000
Accounts payable	10,653,327	19,983,256
Accrued expenses	5,950,564	5,952,902
Depreciation reserves	9,902,841	6,433,936
Surplus	175,242,728	131,604,907
Total.....	$203,749,460	$165,975,002

Reduce Proposed Taxation On Motor Cars and Accessories

"Motor car owners generally will unhesitatingly acquiesce in the revised taxation which the Senate Finance Committee has just placed upon self-propelled vehicles that are now in use," comments President David Jameson of the American Automobile Association, referring to the action of Chairman Simmons and his Senate associates in practically cutting in half the horsepower tax contained in the taxation measure passed by the House of Representatives.

"It was to be expected that the automobile would be included in the things selected for revenue raising, for, while the average car is nine-tenths utility, we must grant that a fraction of its operation is for enjoyment purposes," avers the A. A. A. head. "With the new rates extending from the lower powered cars at $5 and the highest ones at $25, there can be no pronounced objection, especially since the Senate committee also cut in half the tax on new cars, reducing it from 10 to five per cent., and took similar action in regard to tires and accessories.

"In the communication addressed by the A. A. A. to the Senate Finance Committee, we set forth that the automobile already had received considerable taxation attention in the several states and in consequence it would be only just that in passing upon any Federal excise impost, even for war purposes, this fact should be kept in mind. The findings of the committee would indicate that our statement of the case may have met in no small degree the views of members.

"We also presented to Chairman Simmons for interpretation the question of the taxation of a car not in use during the war period, owing to the presence of its owner in service on the other side. The point was raised by one of our directors, Major John A. Hawkins, also an officer of the Automobile Club of Pittsburgh, who wanted to know if a man serving his country would be expected to pay a tax on a car which temporarily rested on jacks. Chairman Simmons brought the subject before the committee and a prompt reply came to the effect 'that in the case of an automobile that is not used at all there is no tax: the tax is upon the use of the car.' Previously there had been some doubt in the matter and the declaration from the Senate committee will be accepted with satisfaction.

"When the Senate will have passed its war tax measure and its conferees and those of the House come together, it is to be hoped that the representatives will concur in the action of the senators in giving the motor car its proper place as a present day necessity."

GENERAL MOTORS NET PROFITS FOR SIX MONTHS $26,078,120.

The General Motors Corporation reports for the six months ended June 30 last as follows: Net profits after all expenses of manufacture, maintenance, selling and administration, as well as ordinary taxes, insurance and depreciation $26,078,120; Federal taxes and extraordinary expenditures, $13,490,861; balance, $12,587,259; General Motors Corporation proportion thereof, $12,307,784; preferred dividends (six per cent), $590,304; undivided profits, $11,717,480.

The balance sheet, as of June 30 last, compares with the balance sheet as of Dec. 31, 1917, as follows:

Assets—	June 30, '18.	Dec. 31, '17.
Permanent investments	$68,708,687	$38,931,935
Miscellaneous investments	5,922,688	2,030,273
Cash	31,186,737	18,865,645
Liberty bonds...	9,098,123	1,255,000
Notes and accounts rec....	23,975,413	13,595,539
Inventories	56,219,729	46,559,394
Deferred expenses	1,231,360	854,435
Good will.....	.....	*11,697,503
Total assets..	$196,342,737	$133,789,724
Liabilities—		
Preferred stock.	$19,676,800	$19,676,800
Common stock..	105,141,700	76,873,300
Outstanding stock sub. cos. not owned by G. M. Corp...	540,500	540,500
Surplus sub. cos.	1,138,558	859,083
Accounts payable	16,032,126	10,665,713
Notes payable..	1,100,000	.....
Taxes pay rolls, etc.	7,287,600	4,858,327
Reserve for two months proportion pfd. dividend	190,768	196,768
Reserve for Federal taxes and extraordinary expenditures..	15,865,735	6,939,019
Reserve for sundry contingencies	2,657,196	1,671,818
Surplus	26,705,753	11,508,392
Total liabilities	$196,342,737	$133,789,724

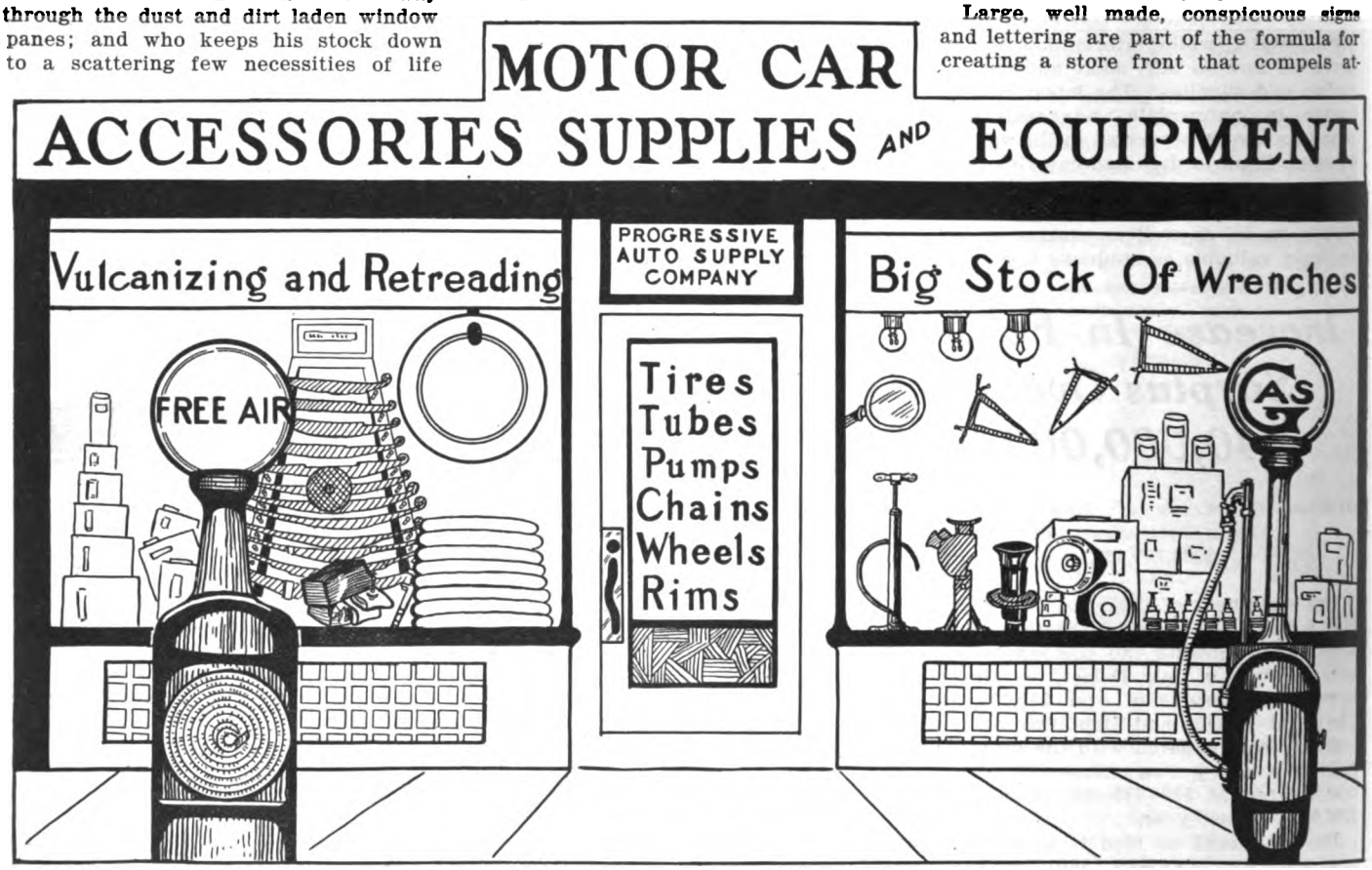
*Good will in the statement as of June 30, 1918, was included in the permanent investment account.

The surplus after payment of dividends at the rate of six per cent. on the preferred stock for the six months ended June 30 last is equal to 11.14 per cent. on the $105,141,700 outstanding common stock, or at the annual rate of 22.28 per cent. Therefore, it is apparent that during the first six months of 1918 the General Motors Corporation showed earnings on its common stock equal to an annual rate of 10.28 per cent. in excess of the 12 per cent. dividends now being paid on that issue.

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Attractive Store Front and Well Dressed Windows Necessary For Success of Dealer in the Motor Car Trade

The way a large number of automobile accessory and supply dealers conduct their business is suggestive of the archaic system of trade still pursued by the merchant at Podunk Crossroads, who keeps his merchandise well tucked away behind dusty counters in a room lighted by the few straggling rays of sunshine that can find their way through the dust and dirt laden window panes; and who keeps his stock down to a scattering few necessities of life and never orders anything else until he gets an order from some customer.



The Well Dressed Store Front Is the Dealer's Best Asset.

Make Known the Fact That You Are in Business and in It Right with Every Line and Every Service to Offer.

It will immediately be said that this comparison is drawn with considerable exaggeration and while it may be, the analogy is still true, as there is found an equally sharp contrast in the appearance of the business places of the most prosperous accessory dealers in a town and those who are just hanging on. This situation presents nothing but the working out to form of the adage that "nothing succeeds like success," as the prosperous appearing dealer really prospers and progresses, gaining momentum all the time while the other fellow continues to only hang on.

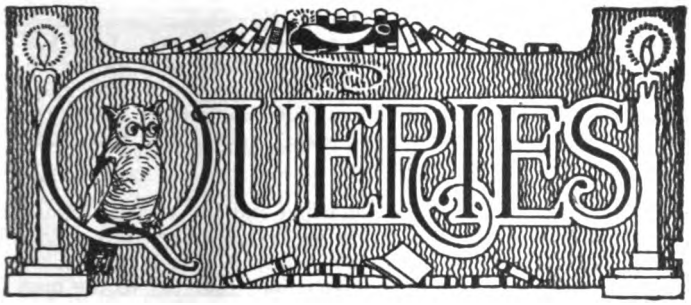
There is nothing fundamentally different about the business of selling automobile accessories and supplies from that of dealing in hardware, housefurnishings or anything else, and yet it would seem from the outward appearance of a far too large number of accessory stores that the proprietors think that through some special province they enjoy immunity from the laws of business that are really obligatory if one is to succeed. Almost without exception the prospective customer, in seeking a place to patronize will be influenced in making his choice by the suggestion offered through the outward appearance of the store, and if it is one indicating a progressive policy, that is what determines and fixes the selection. This rule is even more true of motorists in purchasing supplies for their car than with any other class, as it is the most transient business existing.

With these facts well established through experience it should not require excessive pursuasion to make dealers in this line realize the utmost importance of having his store front always in the most attractive condition that it is within his power to maintain. This is infallably true in every place where there is any competition, from the village supporting two stores to the city supporting over a hundred. It is a means through which the fact that the proprietor is alive, alert and well prepared to render any service, is not brought alone to the passing motorists, but to the public, so when anyone is asked the location of a place where accessories or supplies are on sale, this man gets the benefit, as his store is the one that has created stronger impression in the people's minds.

Large, well made, conspicuous signs and lettering are part of the formula for creating a store front that compels attention, but other things are equally essential, such as gas, oil and air supply stands at the curb and well stocked windows showing a great variety of articles. While the well stocked window not only lends to the general effect of progressiveness, it also is constantly the means of suggesting accessories and supplies to motorists that stop for gas or air and results in sales.

While there is some talk around to the contrary, there is more accessory and supply business in this country today than ever before and it is only a natural consequence of the unprecedented prosperity that exists on every hand and the man in this line of business, if he is in it to any extent, should make hay while the sun shines, as if he doesn't drive his business it will surely drive him and will drive him out.

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NOTICE TO READERS

In this department the Mechanical Editor answers all inquiries sent in by readers concerning any information as to the repair, maintenance, adjustment, use or abuse of the motor car or any of its parts. The service is free to every subscriber. Letters should always bear the writer's name and address, and the car, part or trouble which is the subject of the inquiry should be carefully identified and described. Be sure and give name and model of your car.

Any interesting letters received, bearing on timely subjects as to the maintenance and operation of motor cars or describing new and practical suggestions for the car owner or motor mechanic, if published, will be paid for at space rates.

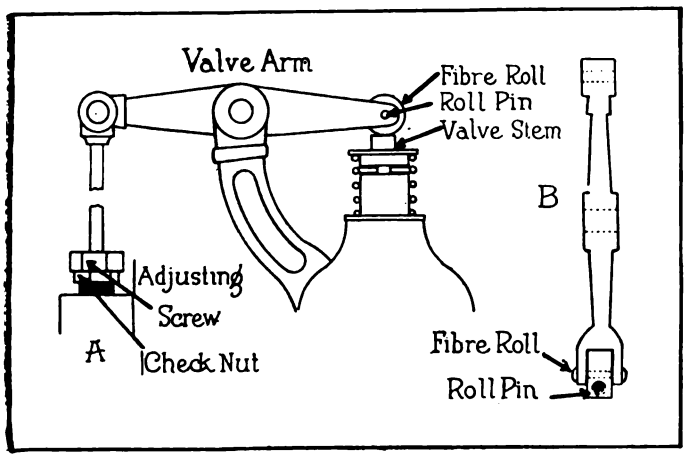
Address all communications to the Mechanical Editor.

SILENCING OVERHEAD VALVES.

(A. L. G., New York City.)

The valves on my car are of the overhead type, and they have developed a rattling sound. Can you tell me how I can fix them and eliminate the noise without going to much expense, as the car is a very old one and I do not wish to expend much money on it.

On the majority of overhead valve type engines small fiber rolls are generally fitted on the valve arm at a point where it touches the valve stem. This is done for the purpose of obtaining noiseless operation. As a rule these rolls are allowed to rotate as they please. At times they do this with a certain regularity, while at other times they remain stationary, which, of course, results in uneven wear of the rolls. When they are allowed to run unevenly the result will be uneven



Illustrating How to Silence Noisy Overhead Valves.

timing and an engine that does not operate smoothly. A simple way to overcome the noise you mention is to remove the valve arm and slightly rivet the pin upon which the roll is mounted. It will require only a little riveting to make the roll stationary. The valve arm and the roll when adjusted is shown in the sketch at B. You can then time the valves with some degree of accuracy. When the rolls become so worn that a gap larger than is required appears between the valve stem and the roll, adjustment can be made by letting out on the push rod adjusting screw.

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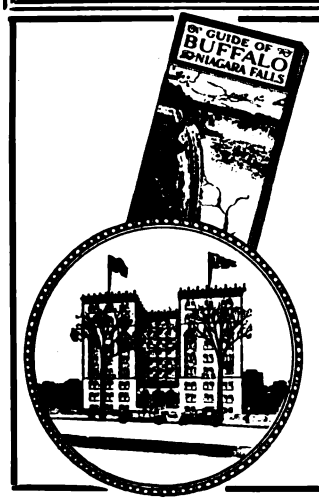
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European Plan Exclusively

Popular Priced Restaurant

C. A. HOLLINGSWORTH.
President and General Manager



Accept this Guide with our compliments

Illustrated guide to points of interest in and around Buffalo, including Niagara Falls.

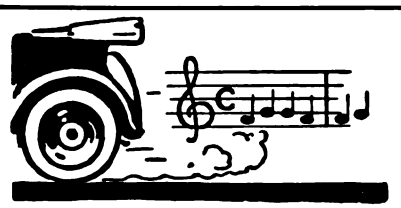
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Buffalo's ideal Hotel for tourists. Convenient to theater, shopping and business districts and Niagara Falls Boulevard. First-Class garage.

European plan. Fireproof, modern. Unusual cuisine. Every room an outside room. $2.00 up. On Empire Tours. Road map and running directions free.

C. A. MINER, Managing Director.



Motoring Is One Sweet Song

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They make your car run smoother, quieter, farther per gallon of "gas" and with less upkeep.

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PREVENTS ACCIDENTS

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TIMES BUILDING
PAWTUCKET, R. I.

REGULATING HUDSON CONTROL.

(G. I. C., Taunton, Mass.)

My car, a Hudson Six, 1916, uses too much gas. I start of course on "choke," moving over to "cold" as soon as the engine gets hot enough. I then run with accelerator. The plugs are clean and so are the cylinders, but I cannot get more than 10 miles per gallon, sometimes less. I never run fast, averaging about 15 miles per hour.

If your engine is in good condition and the various adjustments correct, as they seem to be, would suggest that you study the instructions given below and if better results are not obtained would advise that you take your car to the man in your town who makes a specialty of repairing Hudson cars and have it looked over.

When the carburetor air control lever is turned to "hot," or center position, hot air is drawn from the exhaust manifold through the carburetor. This position is most suitable for cold weather, as warm air helps to volatilize the fuel. When lever is turned toward left to "cold" on dial, only cold air is taken through the carburetor. When turned to "choke" on dial the control is in the choked or "strangled" position. In this instance the air supplied to the carburetor is materially decreased and suction from the motor increases the quantity of gasoline drawn into the cylinders.

This lever should be turned to "cold" in warm weather and to "hot" in cold weather. In starting, especially in cold weather, it may be turned to "choke" to assist in priming the cylinder. Whenever the "choke" is used the hand throttle must be opened one-third when cranking. By turning the lever to choke position, thus applying the choke before turning off the ignition, the cylinder will be supplied with a rich mixture of gas, which will materially assist in starting next time.

There are various other positions between these three indicated, which may be used for different weather conditions, the correct point being determined more or less by experimenting with the car in operation. It is possible that some of the following troubles may be responsible for the poor mileage you are obtaining: Loss of compression due to leaky valves; too rich a mixture through some defect in carburetor, probably flooding due to grit under float valve; late ignition; lack of water in radiator or oil in motor, causing the motor to run hot; poor grade of gasoline, in cold weather, causing too weak a mixture; dragging brakes; see that the car can be rolled by hand easily or that it will coast down hill when clutch is released and not slow down; feel the brake drum with your hand to determine over-heating; flat tires; stoppage of the jets in carburetor due to dirt or sediment.

In the compensator there is a pocket of gasoline in the passage, and also around the main jet, when the well is in action, supplying the motor for idling purposes. Immediately the throttle is opened the suction on the top of the cap jet commences to draw gasoline from it and also from the main jet. Before these jets settle down to deliver their steady flow, however, the pocket of gasoline contained in the space between the jet and cap jet and in the passage leading to the compensator must be examined. This sudden enriching of the mixture when the throttle is opened gives the engine better acceleration than otherwise would be possible without using an over-rich setting at all times. The size of the compensator does not affect this condition, but the level of gasoline does, since it decreases or increases the amount of gasoline in the pocket, according to whether it is too low or too high, respectively. The gasoline level should come exactly 3/16 inch below the top of the cap jet.

After the pocket of gasoline is exhausted the main jet and the compensator supply the gas necessary to run the motor at the higher speeds. It is easy to see that where there are two small openings instead of one large one there is a much greater range possible for varying the flow. To cut down the amount of gas used, therefore, either one may be changed for a smaller size. The determination of the best one with which to commence operations can only be made after they have both been removed and their sizes noted. The compensator is usually "five" larger than the main jet for ordinary climate and normal running, say up to 40 miles an hour. For hill climbing in normal altitudes and where constant pulling power is needed without excessive speed on the

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level, "10" larger will be better. If more speed than 40 miles per hour is required and that on good level roads, or where there is always a good run at the hills and they can be climbed as fast as the car will go, the main jet will need to be equal to or larger than the compensator, according to the speed of the motor.

The two always work together, but the compensator is affected most by the lower speeds up to 20 miles per hour, and the main jet is affected by the speeds above 20 miles per hour, and it becomes more noticeable as speeds above 40 miles per hour are reached.

In reducing gas consumption it is safe to assume that the size of the main jet can always be reduced first. If this step affects the acceleration too noticeably, increase the compensator "five." This may strike a happy medium. Economy and speed, and especially "jam down the throttle" acceleration never go together. The most economical setting will give only normal acceleration unless the accelerator pedal is depressed gently, and the throttle must never be slammed upon suddenly or the motor will starve, especially if it is at all cold. It does not require very much mixture to supply a motor running at 665 revolutions 20 miles per hour, and the throttle does not need to be open but very little to keep it running at this speed. To accelerate at low speeds, therefore, the throttle must be opened slowly, thus feeding only the amount necessary and vaporizing it more perfectly by drawing it past the small opening around the throttle valve, or churning it. Rapid acceleration with a wide open throttle can only be obtained by excessive use of gas, no matter what make of carburetor be used, and it cannot be done economically.

CARBURETION TROUBLES WITH A FORD.

(A. M. R., Sprnigfield, Mass.)

I have a Ford Sedan, 1917 model, equipped with a Gray & Davis starting and lighting system. The gas tank holds but nine gallons. As the gasoline is fed by gravity I cannot make long, heavy, upgrades with the Stromberg carburetor I recently put on if my tank is not completely filled, and once I failed under this condition on a long 12 per cent. grade, something that never happened while I had the original carburetor on my car. This change has also resulted in a heavier consumption of gas than lower.

I would also like to know if there is a small auxiliary tank on the market that can be placed under the hood, which, with proper connections to the instrument board, could be used in climbing steep hills. Something tight and safe, holding half a pint or little more.

Assuming that you have installed a model L Stromberg on your Ford, as that is the type designed for the purpose, it would appear that your principal trouble lies in the gasoline connections. There is a small pipe section, "U"-shaped, furnished with the Stromberg to be used in connecting it with the main feed line. A number of instances have been called to our attention wherein this section has been fitted with the bend in a position above the two ends, instead of laying flat on a level with the connections. When this mistake has been made trouble always ensues, as the flow of gasoline would readily become locked in the "U" unless there was considerable pressure behind it. Trouble from this cause would of course increase when the car was ascending a grade as the "trapping" action in the bend would become more complete. If this connection, however, has been properly fitted and the trouble continues it would be a good idea to test out the gasoline feed line from the tank and see that it is absolutely free of obstructions. After this has been ascertained the carburetor should be thoroughly cleaned, and then the only question remaining is that of control and adjustment of the latter.

The model "L" Stromberg is a compensating jet type and differs from others in that air is introduced into the gasoline before it emerges from the jet, which is composed of a series of holes drilled around the throat of the venturi passage, and arrangement is made for supplying a small quantity of rich mixture above the throttle for idling. A little mixture flows directly in the manifold above the throttle for starting and provides a good mixture when the throttle is practically closed.

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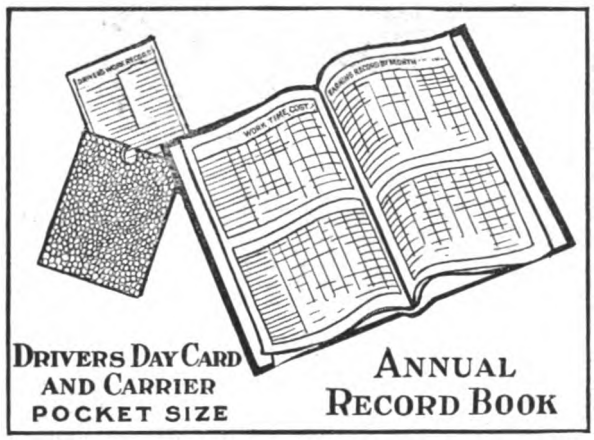
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the gasoline feed adjusting screw opened about 24 notches, so that the exhaust burns black, showing too much fuel, turn this screw down slowly until engine begins to miss, and then turn it up gradually until there is even firing. This adjustment should be made at various engine speeds. For idling turn the other large screw which enters the intake section of the carburetor between ½ and 1½ turns clockwise off the seat. After the engne has been warmed up this may be regulated. Turning to the right gives more gas; and to the left, less gas. This adjustment has effect only when the throttle is nearly closed.

The spark should be fully retarded and the throttle opened to a position which turns the engine at a speed corresponding to about 20 miles per hour to adjust the economizer. The lever should be set one notch less than for a mixture on which the engine will run steadily and under normal conditions this should be the third or fourth notch.

As to the use of an auxiliary tank to overcome the difficulty you experience with the feed on grades, would advise that you purchase one of the various vacuum feed systems that are on the market. These are designed specifically for this purpose and should give entire satisfaction.

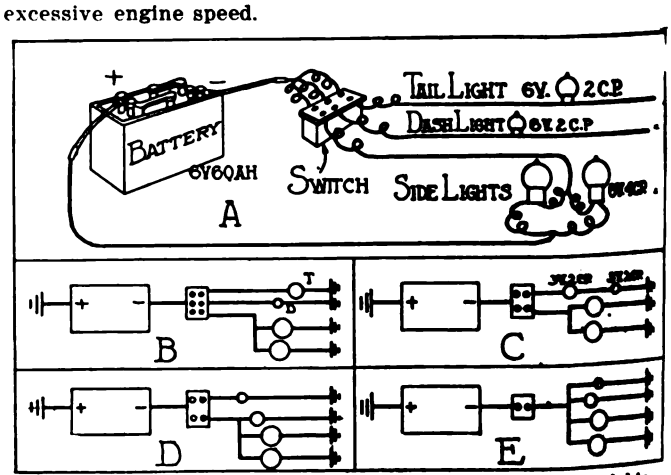
FORD LIGHTING PROBLEMS.

(N. E. H., Bridgeport, Conn.)

Will you kindly publish a diagram of the wiring system on the 1914 Ford lighting circuit for electric lights from storage battery six volt, 60 amperes, to aid me in converting my side lamps and tail lamp and to install a small dash lamp on a switch. Would also like to secure information to aid me in placing an electric light on the rear end of a Ford landaulet from the magneto and as to how the wires could be connected to the regular Ford lighting switch.

In answer to the first question would say that there are several ways to do this and some of these we show so that you may select the one you think best adapted to your needs. Of course you realize that it must not be attempted to use the storage battery in connection with the Ford magneto as a means of keeping it charged. That magneto or generator is an alternating current affair, while storage batteries and charging dynamos or generators are direct current. So unless you anticipate installing a charging generator, it is a straight proposition of connecting the desired lights from a battery, which is what is shown.

Adapters for converting oil lamps into electric are procurable at most any automobile supply house and are easily attached. Also, it is possible to obtain a transformer for your headlights so that you can have a steady light at all speeds of your motor without the danger of the lights burning out at excessive engine speed.

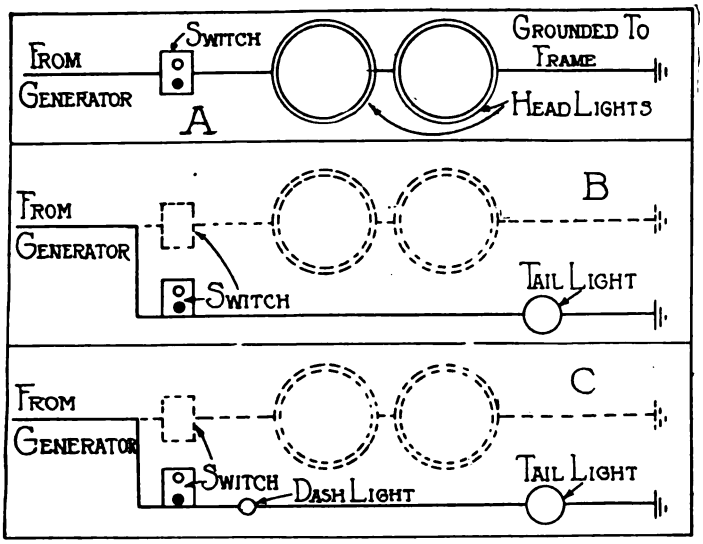


Several Ways of Wiring a 1914 Ford Car for Electric Lights from Storage Battery.

The diagrams shown will be easily understood with the possible exception of the one where the dash light and tail light are in series. This is done to give a positive means of knowing that your tail light is lit. To accomplish this end three-volt bulbs are necessary, which are put in series with each other.

The first diagram shows each set of lights controlled by a separate switch using a two-wire system. The second (as

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Plan for Installation of Electric Lights on Ford Landaulet.

well as the others) show a grounded system, i. e., using the frame or metal part of the car for the return circuit. While in this particular case it is immaterial, it is usually the custom to ground the positive or + marked terminal of the battery. With a 60 ampere-hour battery any one of the wiring arrangements shown ought to run all the lights for about 23 or 24 hours continuously by using the Mazda C lamps.

Regarding the installation of a rear light on the landaulet, adapters for transforming oil lamps into electric lamps, can be procured at automobile accessory stores. These do not prevent the oil lamp from being used should the electric system fail you. To utilize the regular magneto current for the tail light will generally be found unsatisfactory. You probably know by experience with electric headlights that at times they are very dim and then again they are often excessively bright. By the nature of the apparatus this is unavoidable without some change or added accessory. So if utilized to light the tail lamp you might at times find embarrassment in that it might not comply with the requirements of the law.

To have a steady light in the rear either install a storage battery or a set of dry cells. These, of course, must be used independently and not connected up in any way with the generator, or magneto. However, should you, in spite of the disadvantages stated, desire to have the generator furnish current for the tail light, you can easily do so. You can either connect to the wire supplying the headlights at the switch for the same or you can connect at the source of current and have a separate switch for the tail light.

If your car is a 1915 or 1916 model get a bulb called G-6 18-24 volts. If the car is a 1914 or earlier get a G-6 12-16 volts bulb. If you wish a positive means of knowing if the tail light is working, install a small dash lamp in series with it so that it will burn or go out just as the tail light does. In this case get G-6 10 volt bulbs for 1915 or 1916 cars or G-6 6-8 volt bulbs for other cars. Connect as shown in illustration.

CARE OF BRAKE BANDS.

W. G. F., Dover, N. H.)

Recently while out riding I used my emergency brake in stopping and when I wanted to start again the brake would not release. By having a friend work the lever back and forth while I shook the car and struck the wheels, we released it. Can you tell me what made it stick?

It would seem that your trouble is due to the shoes of the internal expanding brake being worn, so that when the cam which expands the brake is operated it turns sufficiently to become horizontal in position. This makes it impossible for the springs connected to the brake shoes to release the brake from against the inside of the brake drum. It is best to fix this at once; you may not always be able to release them in the manner you describe, and the trouble grows worse with neglect. You should either have new brake shoes fitted or have pieces added that will reduce the clearance between the shoes and the cam.

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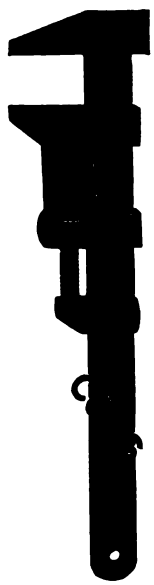
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THE DELCO-BUICK WIRING.

(E. A. M., Brockton, Mass.)

Can you explain the Delco-Buick wiring on my model E-6-45. I have had considerable trouble with the battery, which runs out too frequently, and I believe this trouble is caused by a ground connection somewhere in the system, because the ammeter indicates "charge" when the engine is running and the lights are not on.

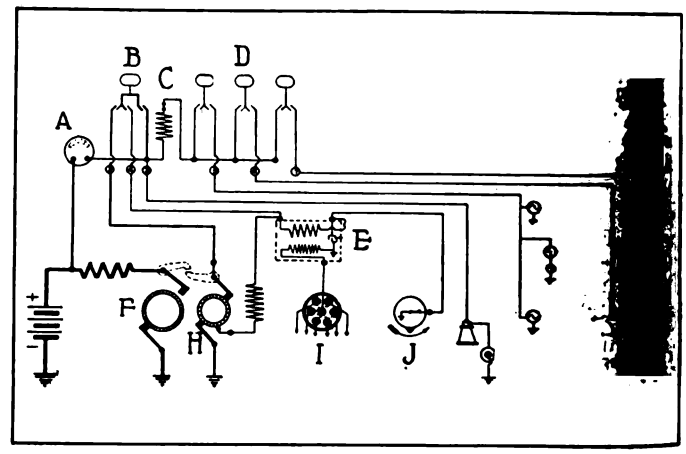
You should be able to locate a ground or short circuit in the system, but you will first have to procure a testing outfit or make one by obtaining a light socket and placing in it one of the headlight bulbs. The wires leading from this will be referred to as testing points in the following instructions

Disconnect the positive battery wire from the battery and touch one test point to the wire and the other to the battery terminal, making this test with all switches off. If the bulb glows or lights, disconnect the wire from the ammeter. If bulb goes out when this disconnection is made, indications are that the ground is on the other side of the ammeter.

Should the bulb remain lighted, disconnect the heavy wire leading from the battery to the motor at the motor end. If the light goes out the trouble is in the motor and it would be advisable to consult an expert repair man and have him make a thorough examination of the motor.

In case the bulb should remain lighted the indication would point to a ground between either the battery and ammeter or between the battery and motor.

In the first test, if the light glows and indicates trouble



Delco-Buick Wiring on Model E-6-45. A, Ammeter; B, Ignition Switch; C, Cut-Out; D, Lighting Switches; E, Ignition Coil; F, Motor; H, Generator; I, Distributor; J, Breaker Box.

on the other side of the ammeter, the circuit is probably grounded in the horn wire. To make certain of this, disconnect it at the switch (3) and watch the light bulb. If the light goes out the circuit is grounded in the horn wire, otherwise make careful examination of switch connections and be sure that all connections are made as in diagram. Also make certain that all lint, dirt, dust and other foreign matter is removed from the switch terminals.

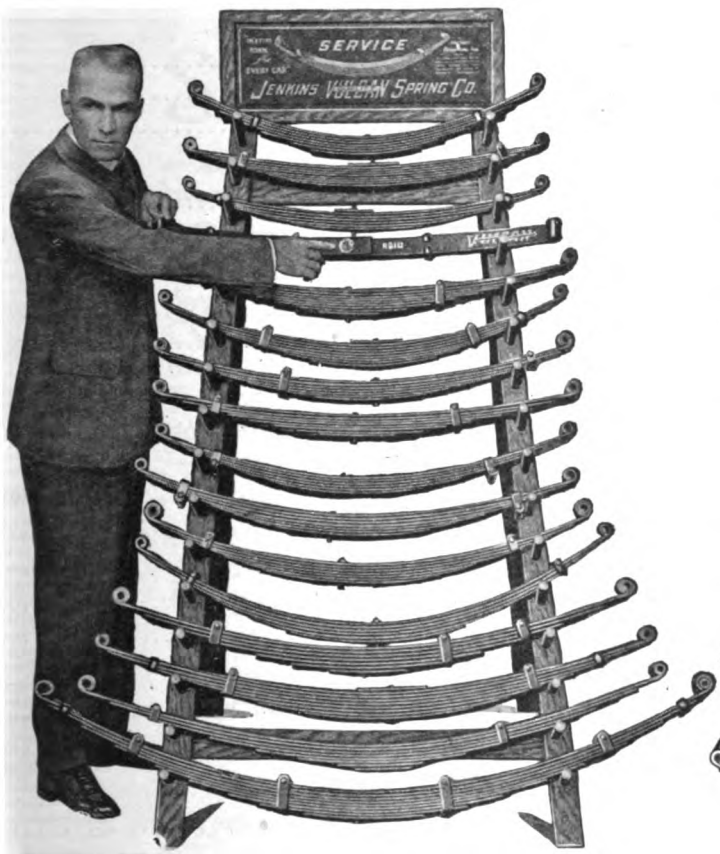
For the second test, in case the light does not burn in the first one, try each lighting switch in succession. In every case bulb will glow, but if it burns at full candle power the ground connection is in the lighting circuit controlled by the switch, which causes the bulb to burn full candle power.

If the trouble is not located in either of these tests, pull out switch B (ignition) with lamp connected as in first case and all lights off and the light will probably burn. Disconnect wire No. 2 at generator and wire No. 4 at ignition coil. If lights continue to burn the ground is on one of these wires. Disconnect each in turn at the switch to locate the trouble.

After removing the test lamp and restoring all connections, pull out ignition switch and note whether the generator motor shaft revolves. If the shaft does not revolve the unit is at fault and a repair man should be consulted. If it does revolve the starter works properly and the ignition unit functions, the battery charging trouble is due to low charging current, in which case it would be advisable to seek the advice of an expert on generator troubles.

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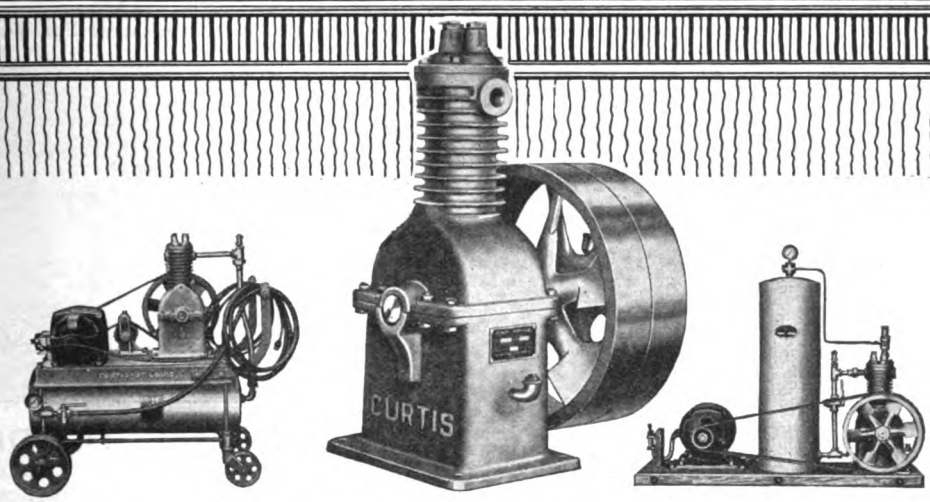
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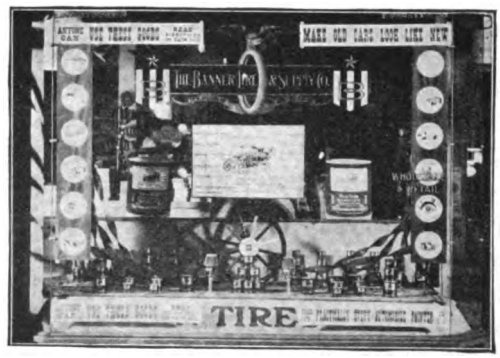
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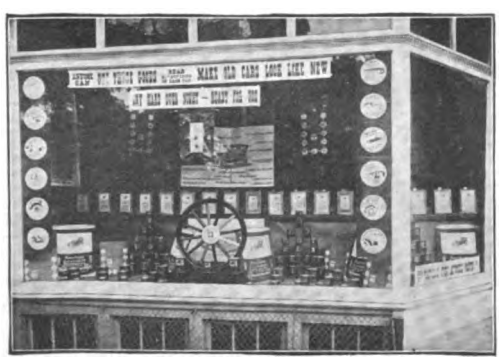
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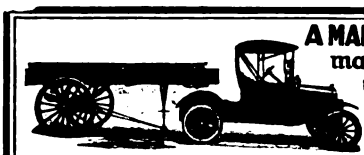
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32x4	$7.25	36x4½	$10.50
33x4½	$9.25	35x5	$12.50
33x4	$8.00	37x4½	$12.00

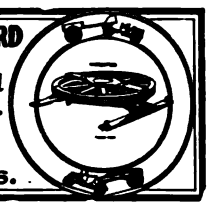
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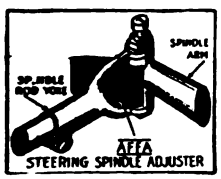
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"Twelve-Twenty" is certain to become a tremendous profit-earner for the dealer like the rest of the Norwesco Line, among which are SEMENT-OL, the radiator cement with a million users, and SKALEX the radiator cleaner.

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"TWELVE-TWENTY" will be pushed by a great advertising campaign in the Saturday Evening Post. You know what that means.

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THE AUTOMOBILE JOURNAL

VOL. LXVI. PAWTUCKET, R. I., NOVEMBER, 1918. NO. 4.

INDUSTRY URGES SUPERVISION BY PEACE INDUSTRIES BOARD

Manufacturers in Conference Propose Governmental Control of Reconversion to Normal Production to Insure Against Conditions That May Result in Retardation or Demoralization—No National Shows Until 1920—Car Shortage of Planned Output of Year About 1,000,000—Truck Production Much in Excess of 1917's 160,000 Is Regarded as Certain by Builders

REPRESENTATIVES of more than 100 automobile manufacturers at the special meeting of the National Automobile Chamber of Commerce, in Washington, on Monday, discussed the after the war program as it relates to the return of the big industry from a war to a peace basis. The keynote of the discussion involved suggestions that the elimination of war work should progress with a constant view as to the effect on labor.

It was suggested that the War Industries Board should become a Peace Industries Board to act as a balance wheel in the conversion, and committees were appointed to cooperate with them in this work. The Passenger Car Committee will be Hugh Chalmers (Chalmers), Alvan Macauley (Packard), Harry M. Jewett (Paige-Detroit), Roy D. Chapin (Hudson) and Charles Clifton (Pierce-Arrow), and the Motor Truck Committee, George M. Graham (Pierce-Arrow), Windsor T. White (White), R. H. Boyston (Service), S. M. Williams (Garford) and A. C. Burch (Clyde). President Charles Clifton occupied the chair and practically every big motor company was represented, including Packard, Pierce-Arrow, Locomobile, Paige-Detroit, Studebaker, Cadillac, Buick, Chevrolet, Chalmers, Peerless, Overland, Cole, Hudson, Hupmobile, Maxwell, Kissel, Reo, Mitchell, Briscoe, Ford, Liberty, Premier, Lexington, Oldsmobile, Moline and Stutz.

Manufacturers Reject National Shows.

The manufacturers decided by an overwhelming vote not to hold national shows at New York and Chicago in the winter of 1919. They were actuated by the belief that it would not be possible to prepare such exhibitions as will do justice to their desire to present at the proper time such a display as will be representative of the industry and properly celebrate the victory in which it has had so prominent and successful a part.

It was brought out at the meeting that the normal production of passenger automobiles for 1918 would have been about 2,000,000, as 1,718,000 were produced in 1917. The output was curtailed voluntarily 30 per cent. last March, and again in July was reduced to 50 per cent. of the production rate last year. Under this curtailed program it was estimated that the output in 1918 would be less than 1,000,000, creating an artificial shortage of approximately 1,000,000 cars for the year.

As rapidly as possible the industry will get back to regular passenger car production, but reconversion from war conditions to peace activities will take some time, so that the industry cannot get into full production until some time next spring. Prices of cars will probably remain at present levels, owing to the high prices of materials and wages and the fact that price reductions can come only with increased volume of production. The industry has shown that with greater production come lower prices and better cars.

Greatly Increased Truck Production.

Truck production was greatly stimulated by the war and plans for the year 1918 were on a greatly expanded basis, but through the action of the War Industries Board, due to the shortage of iron, steel and other materials, the truck manufacturers were limited to approximately the same rate of production for the last half of this year as during last year, when the 12 months output was 160,000.

It was shown that the automobile industry as a whole contributed more toward the winning of the war than any other peace industry of the country, except steel. As the third largest manufacturing industry it took on more than $1,000,000,000 of war orders, including Liberty motors for airplanes, many thousands of motor trucks, officers' cars, trailers, tanks, ambulance bodies, shells, mine anchors, submarine chasers, gun recoils, helmets and many other articles not related to the motor vehicle industry.

In this war of motors—on land, on water and in the air—the automobile industry has been absolutely indispensable. It has contributed more important personnel to the military program than any other, including hundreds of technical men, such as mechanical engineers, metallurgists, chemical engineers and production managers, many of whom have been commissioned as colonels, majors and lieutenants, and thousands of chauffeurs, repair men, etc. Seven thousand mechanics were sent to France by June last to serve in the Signal Corps. Even in the aviation field the personnel was drawn largely from the automobile industry, including the leading American ace, Eddie Richenbacher, who was a prominent automobile racing man. Practically all the Liberty and other airplane motors and many airplane parts have been produced in automobile factories, which were the only plants in the country possessing sufficient manufacturing equipment to produce such engines and parts in the necessary volume.

With reconversion to peace production of automobiles and trucks, it is anticipated that exports will be greatly increased, as it has been impossible to fill the foreign orders during the past year, owing to lack of shipping and shortage of materials.

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Maibohm Six For 1919 Has Aircraft Type Power Plant and Is Much Refined

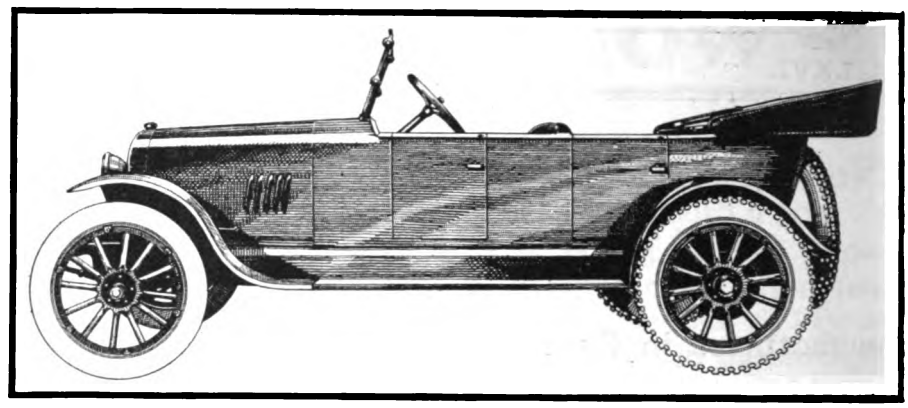
THE Maibohm Motors Co., Racine, Wis., continues its six for 1919 with a new line of bodies that are distinguished for their remarkably good lines and high class coach work.

The chassis is fundamentally the same as the one on which the company has been concentrating its production for the past two years, such minor changes as are evident being more the nature of refinement.

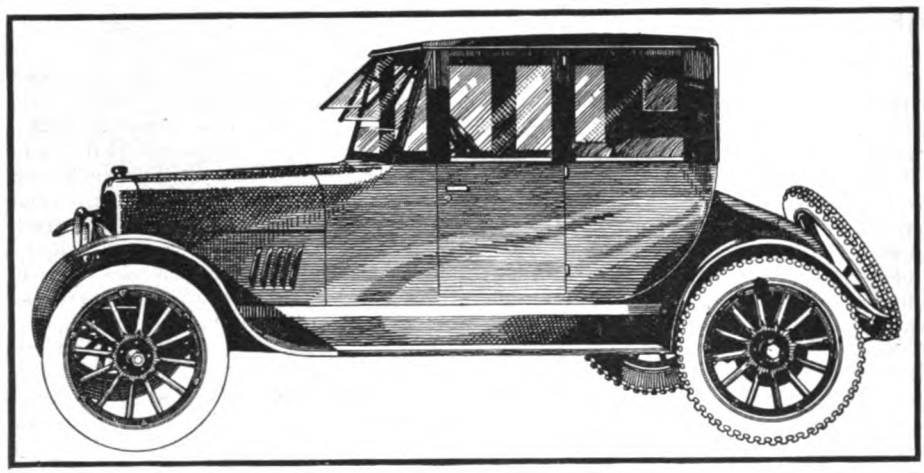
Improved channeling of the gas passages and the delivery of fuel through pre-heated intakes permits the efficient use of low gravity gasoline with a remarkable degree of economy.

The crank case has been changed to permit the new S. A. E. installations of generator, starting motor, distributor and carburetor.

The new phaeton bodies are now equipped with real leather upholstery. The seats are wider and deeper and body edges are sharply beveled.



The Maibohm Six Chassis Equipped with a Phaeton Body with Folding Top, the Streamline Design Being Especially Effective—This is an All-Purpose Type Greatly Demanded by Discriminating Buyers.



Maibohm Six Chassis with Brougham Body, This Having a Seating Capacity for Four Passengers and Suited for Town or Country and All-Year-Round Uses.

Curtains are designed to swing open with the doors and two oval nickel plated curtain light rings have been added to the rear top curtain.

The company is laying extensive plans for a greatly increased "after the war" production. The models are priced as follows:

The Chassis	**$1160**
The Phaeton	**$1290**
The Touring Sedan	**$1890**
The Brougham	**$1890**

Chassis Details.

In principle of design, in materials of construction and in method of production the new Maibohm chassis typify to a greater degree the present standards fixed by the Society of Automotive Engineers. It is in the new trim and simplified aircraft power plant that a startling progress is revealed.

Minimum weight, valves in the head, a counter balanced crankshaft and perfectly balanced reciprocating parts deliver an abundance of power with a smoothness of action free from vibration through all its speed ranges.

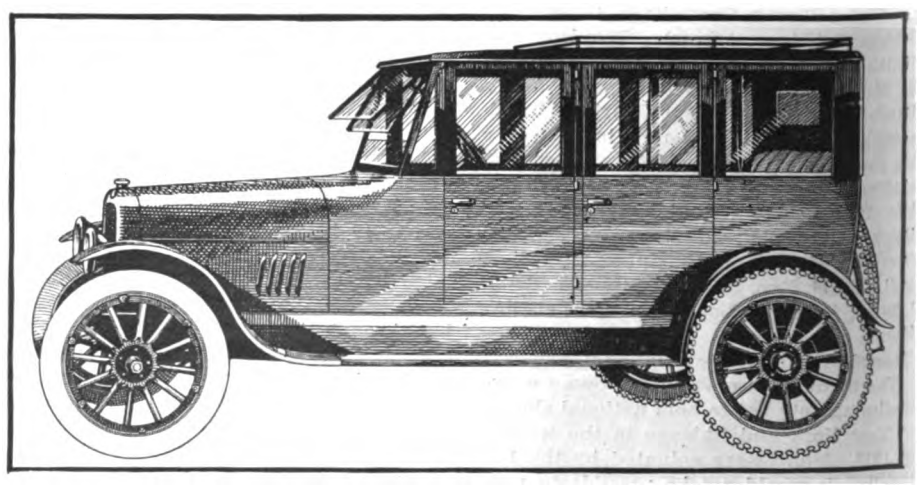
An improved channeling of the gas passages and the delivery of fuel through preheated intakes permit the efficient use of low gravity gasoline with a remarkable degree of economy.

Light weight, perfect balance and long leafed springs of the semi-elliptical pattern give a new standard of comfort for town use of touring. The improved spring suspension eliminates the tendency to sidesway.

Underlying these features are standard qualities which Maibohm has carefully developed in its policy of concentration on one chassis model—safety, riding qualities, smoothness of operation, extreme road ability—an ease of handling and style.

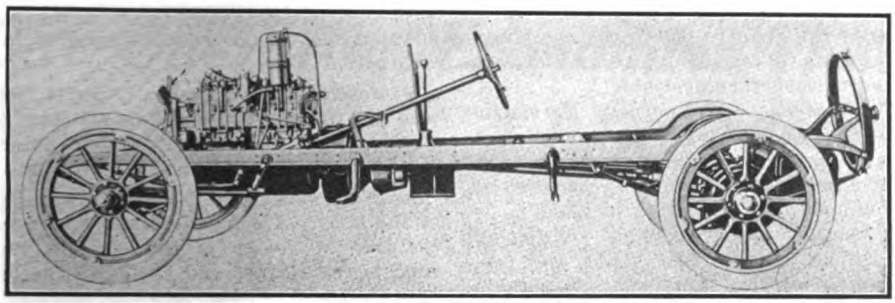
Specifications.

Engine—Six-cylinder Falls, exclusively built for Maibohm, featuring advanced engineering principles of modern aircraft engines; minimized weight, overhead valves, detachable cylinder head, counterbalanced crankshaft, light pistons and weighted connecting rod assemblies. It is silent and vibrationless through all speed ranges and capable of extremely high speed under load. Especially designed for economical carburetion of low gravity fuel. Bore, 3½



Maibohm Six Touring Sedan, Having Practically All the Qualities of Both Open and Closed Bodies, with Seating Capacity for Five—An Ideal Vehicle for General Purposes.

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Side View of the Maibohm Six Chassis, Stripped of Dash, Footboards and Fenders and Running Boards, Showing the Spring Suspension and the Location of the Control Members.

inches; stroke, 4¼ inches; displacement, 195.6 cubic inches; S. A. E. horsepower, 23.44; develops 46 horsepower at 2290 revolutions per minute; maximum speed, 3510 revolutions per minute; weight, 425 pounds; valves in head; diameter, 1⅛ inches; lift, 9/32 inches. S. A. E. nickel steel. Simple adjustment at cylinder head.

Crankshaft—Wyman-Gordon counterbalanced high speed 1⅞ inches diameter, three bearings. Front, 2½ inches; center, two inches; rear, three inches. S. A. E. nickel steel.

Lubrication—Cam-operated piston pump maintaining a steady stream to main bearings, splash from constant level troughs to cylinders.

Cooling—Thermo-syphon, Perfex radiator, two inches inlet and outlets.

Carburetor—Stromberg L. B., with economizer. Foot and hand control.

Fuel Supply—Stewart vacuum system with 14 gallons rectangular tank in rear. Dial gauge and convenient filler.

Ignition—Atwater Kent, manual advance. Distributor mounted to S. A. E. standards on left, rear deck of crank case and driven from camshaft in an independent unit.

Starting and Lighting—Wagner six-volt, two-unit system. Bendix drive starter. Generator drive through helical gears in front gear case. Both mounted to S. A. E. standards.

Battery—Willard six-volt, in steel cradle under front floor boards.

Clutch—Borg & Beck.

Transmission—Mechanics selective; three speeds, one reverse. Mounted to S. A. E. standards in unit with power plant. Gears S. A. E. nickel steel specifications No. 2340; 7-9 pitch, ¾ inch face, 200 involute teeth.

Controls—Center. Overhung levers within easy reach of natural driving position.

Drive—Hotchkiss; two four-inch universal joints and seamless steel tubular propeller shaft.

Brakes—Foot, external contracting; hand, internal expanding; on rear wheel drums; diameter, 12 inches; width, two inches; lining, wire woven asbestos. Simple, positive adjustment by turnbuckle under front floor boards.

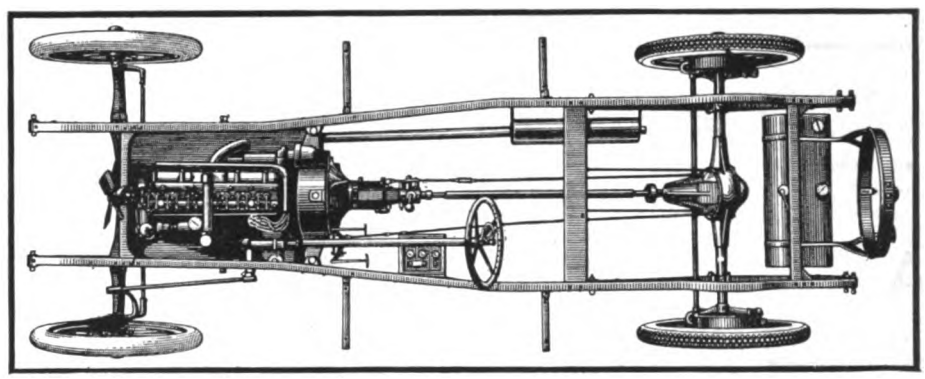
Muffler—Maxim silencer.

Steering Gear—Jacox, irreversible split nut. Simple adjustment. Seventeen-inch notched grip hand wheel, spark and gas quadrant and horn button.

Axle—Full floating. Brown-Lipe-Chapin differential, four pinion type. Gears, 5.5 pitch, 1 1/16 inch face, S. A. E. nickel steel. Drving pinion, 12 teeth; ring gear, 49. Hyatt bearings. Axle and pinion shafts, 1⅛ inches, S. A. E. nickel chromium steel. Both ends of axle shafts 6-A S. A. E. spline. Pinion shaft mounted on one single and one double row thrust bearing with external adjuster.

Gear Ratios—High, 4.5:1; second, 7.875:1; low, 13.68:1.

Frame—3/16 inch pressed steel channel section, S. A. E. carbon steel specification No. 1025.



Plan View of the Maibohm Six Chassis, the Tapering Main Frame, the Power Plant and the Transmission System Being Clearly Shown—Note the Simplified Construction.

Springs—Front, semi-elliptic, 36 by 1¾ inches; rear, semi-elliptic, underslung, 49 by 1¾ inches, S. A. E. carbon steel.

Wheels—Artillery second growth hickory; 12 1⅛ inch spokes front and rear; natural wood finish. Bower bearings.

Rims—Stanweld, straight side, split type.

Tires—32 by 3½ inches S. S., non-skid rear. Goodyear, Fisk or U. S.

Wheelbase—116 inches. Road clearance, 10½ inches.

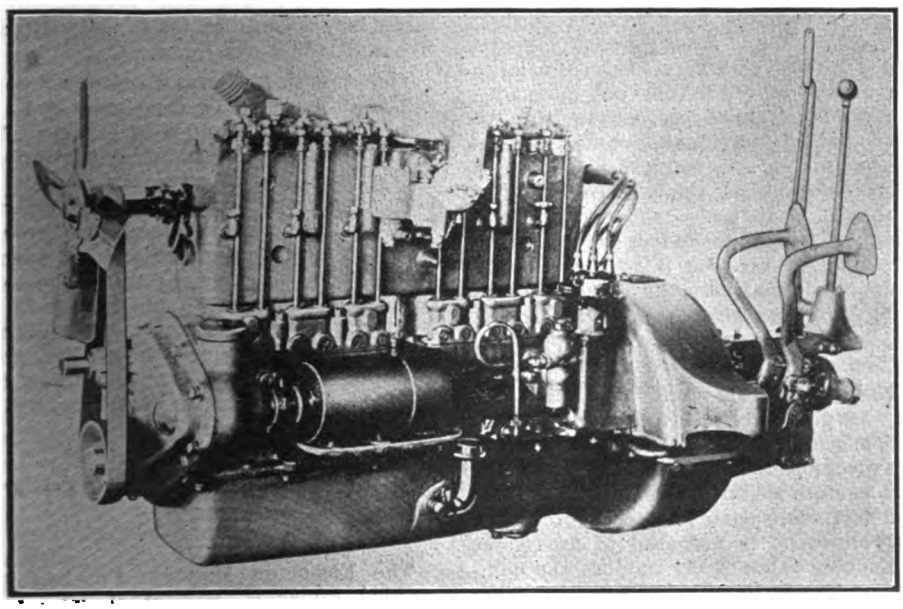
Weight—Phaeton, 2350 pounds.

Top—One man. Black double texture neverleak drab lining. Two oval nickel plated rear curtain lights. Side curtains swing open with doors.

Speedometer—75 mile Stewart-Warner. Gear drive enclosed in transmission case.

Upholstery—Genuine leather. French pleats. Seat backs and cushions shaped over oil-tempered inter-laced steel coil springs. Long napped heavy carpet in tonneau.

Bodies—Maibohm built, seasoned ash and maple; all joints glued and screwed covered with 20 gauge prime sheet steel, welded at seams.



Left Side of the Unit Power Plant of the Maibohm Six Chassis, with the Mechanism for the Overhead Valves, the Lighting Generator and the Control Pedals and Levers in Clear View.

The Phaeton.

Custom coach work has been individualized under the Maibohm trade mark for more than 30 years. The new Maibohm bodies reveal their heritage of the coach builder's art.

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The edges are sharply beveled, the cowl merging in an unbroken line with the bonnet to the high radiator.

A storm tilt windshield intersects at a smart angle, back of which the long, low lines of the body continue with the same easy, unbroken sweep. In this lithe clean limmed grace is provided ample room for five people without sacrifice to the new fuselage line characteristic of sport type custom built bodies so much in vogue with smart, breezy people.

Curtains are individually tailored and designed to swing open with the doors. The outside handles are a great convenience in stormy weather. The result is a notable neatness of appearance and a complete assurance of comfort.

The dignity and luxury of the enclosed carriages are combined with the enjoyable features of the open car in the Maibohm touring sedan.

Windows may instantly be lowered or removed and its ready adaptability to any weather condition has a particular appeal to motorists situated in those sections of the country where the combined advantages of an open car and an enclosed carriage are desirable.

The roof edges and corners are sharply beveled and the top is somewhat lower than other enclosed types. It is provided with a baggage rail for the convenient accommodations of touring luggage.

A smartly inclined double ventilating windshield affords clear vision and protection in stormy weather. A notable point of beauty is the harmonious blending of the exterior lines.

The seating arrangement is for five passengers and the interior appearance reflects the quiet elegance of fine fabrics and distinctive fixtures.

The equipment includes an odorless, effective heating system which can be controlled to maintain an even and comfortable temperature.

The touring sedan is typical of artistry of coach work from the Maibohm work shops.

The Brougham.

This is a single compartment car well adapted to general usage in good or bad weather.

Professional men, especially physicians, who are obliged to go out in all sorts of weather, will find in this vehicle a rare combination of luxury and usefulness.

A free flowing line defines the contour of the body. Among the many advanced features of design is the straight line roof, beveled edges and exclusive custom appearance.

The smoothness and responsiveness of the valve-in-head engine are admirably suited to the brougham. It is patrician in style and an ideal all around general service car in town and out.

Seating accommodations for four people are provided in the reposeful interior of appealing simplicity.

Tailored upholstery and quiet fittings, an effective heating system, lighting arrangements and other appointments are in the same luxurious style as the touring sedan and in perfect keeping with Maibohm coach work.

ESSENTIALS OF TRACTOR SELLING

By J. A. Everson, Tractor Sales Manager, International Harvester Co. of America.

A STUDY of the qualities which the tractor salesman exercises during the process of getting the order reveals a certain skill, a more or less technical knowledge which he did not require nor frequently use as an implement salesman.

Because the implement salesman, more easily and with less readjustment of point of view, can adapt himself to the sale of tractors, it is probably true that his class is the chief source for recruits to the tractor sales army. He already knows the farmer psychology. He has a distinct conception of the farm atmosphere. He is entirely at home in any discussion about related subjects which bob up during the progress of a sale; in fact, he is well qualified in the very beginning to get into the friendly confidence of the farmer in substantial measure.

But in the sale of implements today he depends for success chiefly upon his ability to present convincingly these three essentials, which count most heavily in the prospect's mind—quality, convenience and the service behind the name. Formerly he preceded such arguments by winning the farmer to feel the necessity of the implement. That is no longer an important step in the sale, because the prospect long ago was sold on the need of having a well assorted standard implement equipment, and consequently does not react favorably to repetition of those fundamentals which he knows already almost as well as he knows his own name. So until the advent of the tractor the salesman to the farmer was permitting these fundamentals to get away from him. He was staking his reputation upon quality, convenience and service.

But since the tractor has grown to be such a mighty factor in farming operations, the salesman realized he would have to resurrect the fundamental reasons of necessity if he were to be successful in selling tractors. He would have to draw generously on his entire experience, bringing half forgotten facts up to date, and revamping them to fit the tractor's case. In other words, he now found it absolutely necessary, generally first to bring to bear upon his prospect well supported reasons why a tractor would pay on his farm. He also found he would have to do this before he could expect a hearing on the merits of his particular tractor.

Truly, farmers hear much regarding the profitable and other practical benefits of the tractor, and very likely in a large percentage of cases they are persuaded the whole tractor proposition may be good, but as individuals are not sold on the tractor idea as being the necessarily ideal solution of their own particular problems. Because a neighbor has bought a tractor is seldom the balancing argument. So it is at this point that the tractor salesman has the opportunity to bring into play his reasons of necessity, and give vent to the ripe experience within.

The successful tractor salesman has studied diligently to bring his implement experience into concrete expression, to acquire more accuracy in his statements, and a more definite application of facts and figures to each prospect's problems. Therefore, he is prepared to figure out the money value of the tractor—the number of horses it will displace, the value of the feed and pasture thus released, the value of crops that can be raised on those acres and just what part of these savings will be required to keep the tractor going. This knowledge must be exact and sound that he may hold his own on the farmer's own ground. He presents his reasons of necessity in terms of the prospect's own horses, acres, crops and conditions. In doing so successfully he is traveling in fields strange to the ordinary implement salesman.

But as soon as he has won over the farmer on the necessity of the tractor the salesman reverts to his three cohorts—quality, convenience and service, in order to win a decision for his tractor. From this stage he is back on old familiar ground and can present these three big reasons in their most attractive and persuasive form.

The tractor salesman of today then seems to be broadly developed and to need and use a wonderful capacity for imparting information. He is alive to every issue, posted on every branch of farm administration, crops, live stock, understands the normal operation of every piece of farm equipment and its adaptability, good or poor, to tractor power. He is a past master on the 101 kinds of tractor hitches. He knows the farmer and his ways. He knows the quality, convenience and service arguments for his tractor. All of these he uses expertly as the occasion demands.

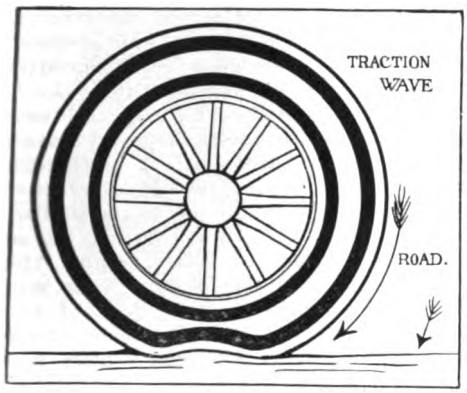
HOHENTHAL NOW MANAGER AT DETROIT.

The Eisemann Magneto Co. has appointed Elmer H. Hohenthal, who was formerly connected with Bosch Magneto and the Simms Magneto Co., manager of its sales and service branch at Detroit.

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Car Operating Economies That Are Practical for Any Driver

Savings Possible When Cars Are Driven with Care



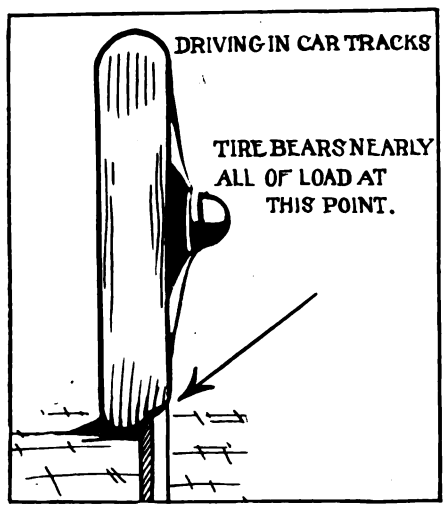
The Action of the "Traction Wave" in the Tread of a Tire, That Causes Friction and Destruction by Separating the Plies If Shoe Is Not Well Inflated.

Just because the tire manufacturer has placed a guarantee of 3000 or 5000 miles on his product does not mean that the tire will be worn to a point of unserviceability when that mileage has been reached, providing it has received reasonable care. Though much has been said and written on the subject of inflation pressures for tires, there is no question that one of the greatest causes that make for tire destruction is sufficient pressure to maintain the tire in the form it is designed to have when used, and through the resiliency of the air content resist wear from contact with the highway and from extreme bending stresses. This lack of pressure is generally a fault with most owners and drivers, in many cases where the vehicle has no power air compressor for inflation, and the tires are inflated by guess and not by gauge.

One should remember that every inch of cross section of a tire requires 20 pounds of air pressure. This is an accepted basis for inflation adopted by all tire manufacturers, and the standards for casings of different sizes are usually molded on them conspicuously, so there should be no lack of knowledge as to the pressure that is essential to obtain the largest degree of satisfaction and at the same time the greatest tire economy.

There can be no reason for failure to understand why tires deteriorate rapidly when not fully inflated. As a wheel and its tire revolve there is a constant bending or flexing of the side walls of the tire at the points of contact with the road surface, and that section of the tire contacting with the surface is compressed, the greatest degree in the center and the least at the edges of the area. This compressed area moves as the tire revolves and it is known as the "traction wave." This wave, of course, will travel as the wheel is revolved, hundreds of times each mile, and it causes an internal movement of the rubber compound that cannot be resisted. The compound must be carefully made and the tire must be well cured to have the degree of resistance that is contemplated by the tire engineer.

The tire, as is generally understood, is composed principally of plies of fabric and rubber compound. The fabric is coated wih rubber that is pressed into the voids between the threads and the plies are practically united when the tire is cured. If the tire is fully inflated there is minimum stress upon the fabric, but if not inflated to the pressure intended the stresses are increased. The bending and flexing of the tire is greatly varied, depending entirely upon the weight, the speed and the road conditions, for the shocks from contact with varying obsta-

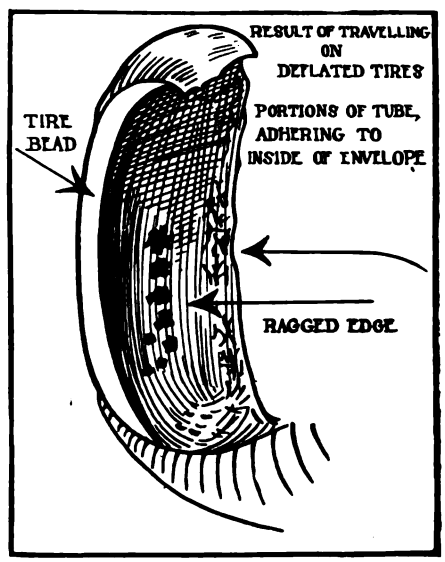


Showing How Tires Are Worn Rapidly by Driving in Car Tracks, the Load Being Borne Principally on One Part of the Tread.

cles will be dependent upon these factors to a very large extent. The tension upon the fabric will be in ratio to the stresses. Assuming that the tire has been well designed and made and is fully inflated, even then the fabric will be constantly flexed, and the result of use is to loosen the threads from the rubber retaining them. If the tire is not inflated to the standard of pressure the stresses upon the fabric and the rubber compound is greatly increased and the result is earlier deterioration. When the tire is kept up to pressure there is distribution of the shocks over the entire structure because the air absorbs a very large part of it and the pressure that is for an instant increased is borne by the entire inner area of the tire. If there is not full inflation the shocks are more localized and the places of contact are more acutely bent. Violent contacts with small road obstacles may result in breaking the fabric or perhaps loosening it from the rubber in which it is anchored in the tire structure.

In the event that there is a cut in the tread the variance of pressure upon the tire will cause the cut to open and close with each contact with the road surface. In passing through a puddle of water moisture is drawn into the cut and expelled. The same result happens when sand or dust is driven through, but when these enter the cut they are not as easily expelled and a grinding action is set up that is accentuated with each recurrence of the "traction wave." Eventually the rubber compound is cut through to the fabric and then the fabric will work loose. The tread rubber is the first line of defense and when this is cut through pockets may be formed where the rubber is separated from the fabric, which will retain moisture and sand or dust. These are sometimes known as "sand blisters." There will be quick destruction of the fabric when sand blisters are formed, and ply after ply will loosen until the tire is so weakened that a rupture will result that is known as a "blowout." A blowout may follow with the inflation pressure much reduced. But the result is the same—a $30 casing and a $4 tube gone.

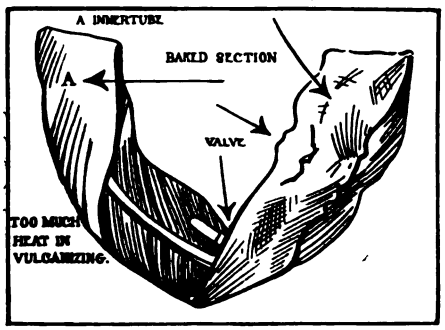
There is no logical reason why one should lose money when air is practically free. Yet the cause may be a leaky valve. Cuts can be repaired quickly and for small expense, even if the work is paid for, and repairing a valve is so trifling that one regards the cost almost as a joke because the cost is so inconsequential. The main cause is neglect—neglect that is so obvious that one cannot fail to establish full responsibility for it.



Condition of a Casing Driven Not Fully Inflated, Both Shoe and Tube Being Ruined by Pressure and Excessive Friction.

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When a blowout happens the vehicle should be stopped immediately, first of all to save the tire casing and tube from damage by rim cutting, and to insure against damaging the rim. Unless one is without means of repairing or changing a

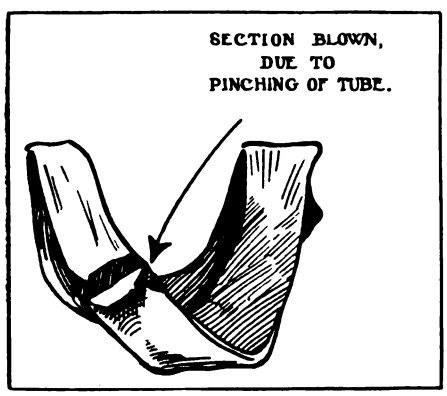


Section of a Tube "Baked" by Amateur Repairer, Who Attempted to Repair Punctures by Vulcanizing, the Heat Being Too Intense.

tire there is no reason why one should drive on a shoe that is deflated. Demountable and quick detachable rims make for quick tire changes. With these and spare shoes that may be carried fully inflated on the machine there is little labor involved in the event of an accident. But if the wheels are not equipped with either of these type of rims and there is need of removing the old shoe, replacing it with another and inflating it, there is nothing gained by failure to driving on the deflated shoe.

The experienced owner or driver will always carry a spare shoe, several spare tubes, and a tire boot or sleeve is very handy and will save time, labor and money. A tire repair kit that consists of cement in tubes, patches, sandpaper, valve parts and several pieces of sheet rubber is always necessary, for with this one can deal with practically any tire failure.

In an emergency, when there is no tube available, the casing may be stuffed with rags, waste, straw and even oats, which will fill it to approximately its normal size and keep its shape to some degree. Then it may be driven to the nearest point, when another shoe may be put on. Those who obtain full mileage from their shoes are comparatively few. The majority of owners and drivers buy two shoes to get the service that should be obtained from one, simply because of neglect or abuse.



Tube Torn by a "Blowout" Resulting from It Being Pinched Between the Rim and Shoe, When Installed by a Careless Worker.

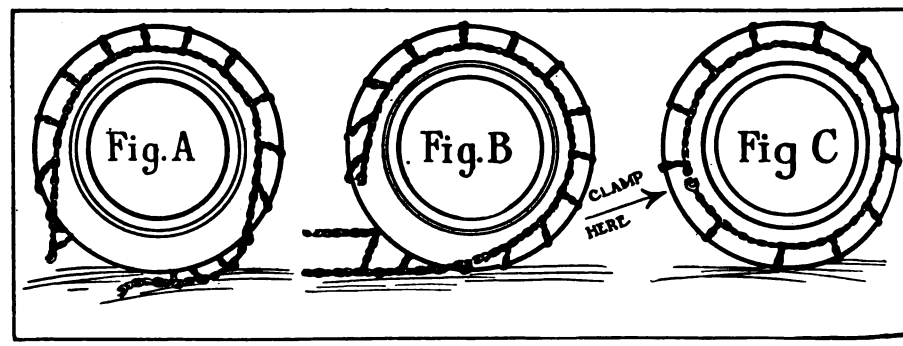
As a rule the tires are sent out from the factories in such condition that good service can be depended upon. But it cannot be realized unless care is taken to protect them as fully as is practically possible. There is no certainty that the average owner can repair tires by vulcanizing. In the hands of one not experienced a vulcanizer may be the cause of much damage. One may bake a shoe so that it will break quickly, or it may not be fully cured and will lack strength and resistance to wear. For instance, a tube was punctured in two places and the driver, desiring to vulcanize both punctures, had no idea of the temperature necessary to insure a good repair. The vulcanizer was used and the heat applied until the rubber was actually roasted and the elasticity was destroyed in the sections that had been punctured. When the tube was inflated it split at both places where it had been assumedly repaired. This was a result of ignorance. Had the driver known what temperature was necessary the repair could have been made at small expense. As it was a new tube was essential.

It is of the highest importance in fitting a tube in a shoe to have it even within the casing and every crease smoothed. Unless care is taken the tube will be subjected to abnormal strain when inflated, especially where it is creased, and one should be sure that the tube is not pinched by the shoe against the rim. The tube will resist great pressure in the casing if perfectly free, but it will rupture very easily if it is stressed abnormally. An over-sized tire is advisable at all times because of the greater length of service that is obtainable. Car construction, power, speed, lateral and traction strains, load and, most of all, car weight, are determining factors in tire life, which are all provided for in standard makes.

APPLICATION AND CARE OF TIRE CHAINS.

As essential as tire chains are for driving power vehicles safely on ice, snow or mud many owners and drivers are ignorant of the best methods of applying them to wheels and for caring for them to obtain the best results so far as wear is concerned. Little thought is given them until wanted, and usually they are wanted badly. If one does not know how chains may be applied time and energy and labor is wasted. The accompanying sketch serves to show the three steps necessary to put on chains with the least labor and to have them function correctly. The first step is simply to drape a chain around a wheel. The second is to move the vehicle forward a foot or less, so that the wheel runs over the chain, care being taken in the first to have the chain hang smoothly. This done all that remains is to secure the ends of the chain and the work is finished.

There is no need to jack the machine to have the wheel clear of the ground, though many owners prefer this method. Others spread the chain on the ground ahead of the wheel and push the vehicle ahead and on to it. This requires time and labor and frequently links will cramp so that the ends will not be near enough to clamp and sometimes jacking must finally be resorted to to put on the chains. The chains should always be put on so they will be free to creep around the wheel or tire. If this is done wear will be kept to minimum, but if fitted too tightly the tire would soon become chain cut, especially on the tread, which will mean unnecessary expense.



The Three Steps of Putting on Tire Chains: Fig. A, the Chain Draped on the Tire; Fig. B, the Wheel Moved Over the Chain; Fig. C, the Chain Closely Wrapped and Ready for Clamping.

Chains should not be allowed to rust. When used in wet weather they should be dried after removing and before being placed in the tool box. They should be inspected for wear, too, and if repairs are needed these can be made quickly and easily with a special chain repair tool. The clamps should be closely inspected. A light coat of cup grease or vaseline applied with a paint brush or a piece of waste will prevent rusting and the necessity of using tools to pry the clamps open or close them. Every owner should carry in a tool box one or two extra cross chains, and with the necessary tool one may make replacement on the road, which will save time as well as prevent noise, and chain efficiency will be greatly increased.

ROADSIDE REPAIR OF A TIMER.

A worn timer may be the cause of an engine misfiring, and with a car with a timer that had been a long time in use we started on a journey of about 200 miles. The first 75 miles there was no trouble, but after that the engine began to miss and we stopped and examined the spark plugs to learn if these were the cause. As these were found in good con-

(Continued on Page 49.)

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Personal News of the Industry in Brief

Frank W. Pilling, well known throughout the middle west, having had long experience as a district manager in that territory, died in Detroit, Oct. 10. He



Frank W. Pilling, Well Known in Motor Car Trade, Dies in Detroit.

was district manager of the Heath-Duplex department of the McCord Manufacturing Co., Inc. Previous to this connection he served the Hupp Motor Car Corporation, Liberty Motor Co. and others.

A. H. Doolittle has joined the Publication Division, Service Department, Bureau of Aircraft, Detroit. He was formerly sales and advertising manager of the Zenith Carburetor Co. of Detroit, and was also at one time connected with the Knox and the Continental Motors Co.

S. V. Norton, manager of truck tire sales of the B. F. Goodrich Co., Akron, O., is one of the men to whom Governor Cox of Ohio has assigned the task of



S. V. Norton, Developing Plan for Motor Truck Transportation.

working out a plan for the development of motor truck transportation.

J. B. Sweeney has become associated with the advertising department of the Firestone Tire and Rubber Co. He was formerly assistant advertising manager of the Paige-Detroit Motor Car Co.

D. B. Groce has been promoted to the management of the truck tire sales department of the Columbus, O., branch of the Firestone Tire and Rubber Co. He was formerly truck and city salesman for the company. William B. Alexander, who has been manager of the Columbus branch, has been promoted to the management of the branch at Omaha.

Charles N. Buchell, prominent in the automobile business, died recently of pneumonia. He was connected with the Buchell Automobile Co., New Bedford, Mass.

Elmer H. Hohenthal, formerly with the Bosch Magneto Co. and Simms Magneto Co., has been appointed manager of the Detroit sales and service branch of the Eisemann Magneto Co.

A. W. Crossman has been made district representative of the Cleveland Tractor Co., with headquarters at Los Angeles, Cal. The territory under his supervision consists of California, Washington, Oregon, Arizona, Utah, Nevada and Idaho.

R. C. Greth, for the past two years engaged in the sale of motor cars at Phoenix, Ariz., and prior to that associated with the Overland and Hudson companies as special representative, has been appointed district representative of the Cleveland Tractor Co. in the Oklahoma territory.

Andrew Kirkpatrick has accepted a commission in the Motor Transport Corps and is stationed at Baltimore. He was formerly vice president and secretary of the L. V. Fletcher & Co., New York.

C. L. Williams is now at the Kansas City branch of the Hassler Shock Absorber. He was formerly located at the St. Louis, Mo., branch. E. L. Hudson has been made manager of the St. Louis branch of the company.

Earl L. Woods has accepted a commission as a captain in the Motor Transport Corps and will shortly go over seas with Unit 304. He was sales manager of the tractor department of the J. I. Case Plow Co., Racine, Wis.

F. N. Morgan has become associated with the Cleveland Tractor Co. in the capacity of district manager. He has been given charge of the southwestern territory, with offices in Oklahoma City. Mr. Morgan was formerly assistant manager of the St. Louis branch of the Studebaker Corporation.

H. L. Hall has been appointed Chicago branch manager of the Swinehart Tire and Rubber Co. For the past eight years he had charge of the western territory for the Troy Carriage Sunshade Co., Troy, O. Mr. Hall has been connected with the automobile industry since its bicycle infancy.

Charles S. Pike is entering the Motor Transport Corps, candidate for a commission as captain. He was recently placed in charge of merchandising of



Charles S. Pike of Paige-Detroit Company, Enters Motor Transport Corps.

motor trucks to be built by the Paige-Detroit Motor Car Co.

E. H. Geyer is now general sales manager of the Hercules Motor and Manufacturing Co., Canton, O.

A. F. Knobiock has been appointed to an important position in the Ordnance Department as assistant to Louis J. Horowitz, recently appointed special assistant to the chief of ordnance in charge of tanks. Mr. Knobloch will act as Mr. Horowitz's special representative in matters having to do with practical manufacturing and technical details in providing the fighting tanks required in Europe. He was formerly vice president and works manager of the Cleveland Tractor Co.



A. F. Knobiock, Appointed to Position in U. S. Ordnance Department.

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C. C. Winningham, Appointed to Service in U. S. Department of Labor.

C. C. Winningham, who was formerly advertising manager of the Hudson Motor Car Co. of Detroit, has been made associate chief of the Industrial Plants Division, Information and Education Service of the United States Department of Labor. Previous to that connection Mr. Winningham was chief of the Gasoline Section of the United States Fuel Administration.

Albert Gough, who was formerly connected with the Shaw Electric Crane Co., Muskegon, where he was engaged in production work, is now in charge of the service department of the Liberty Motor Car Co., Detroit.

George C. Gordon has been re-elected president of the Selden Truck Sales Co., Rochester, N. Y. The other officers are: William C. Barry, first vice president; R. H. Salmons, second vice president; H. T. Boulden, third vice president, and R. E. Reynolds, fourth vice president; E. B. Osborn, secretary; F. J. Kolb, treasurer.



George C. Gordon, Re-Elected President, Selden Motor Truck Sales Co., Rochester, N. Y

C. W. Hollaway is now district manager of the Cleveland Tractor Co., Cleveland, O. He will be located in the Healey building, Atlanta, Ga. His territory comprises Georgia, Alabama, Florida, North and South Carolina and Tennessee east of the Tennessee river.

J. Fred Holland has succeeded Ralph H. Ratliff as sales and advertising manager of the Rutler Manufacturing Co., Indianapolis, Ind. Mr. Ratliff resigned to take up agriculture.

L. H. Boydston, formerly director of sales for the Sandow Motor Truck Co., Chicago, Ill., has become associated with the Service Motor Truck Co., Wabash, Ind., and will assume the duties of district sales manager in the territory comprising Wisconsin, Minnesota, Iowa, North and South Dakota and Nebraska. Mr. Boydston succeeds Frank Drage, who formerly covered that territory for the Service company.

J. S. Burdick, who for the past year has been body engineer at the plant of the Locomobile Company of America, in charge of model body designing construction, has enlisted in government work for overseas service as automotive engineer in connection with fuselage in aircraft construction.

Walter E. Parker has entered the United States army as captain in the quartermaster's division. He was formerly president of the Commerce Motor Car Co. of Detroit.

Miss Nellie D. Prendergast, for a number of years advertising manager of the Pathfinder Co. of Indianapolis, who is nationally known on account of the many publicity campaigns she conducted at the automobile shows in the various cities, has been appointed manager of the motor truck and advertising departments of the Kaufmann-Morris Co., New York City, dealers in Nash passenger cars and trucks and the Titan line of trucks and Premier passenger cars. For the past year Miss Prendergast has been advertising manager of the Bancraft-White Corporation of Syracuse, N. Y.

E. D. Hawley has been promoted to manager of the Studebaker branches in Ohio, Pennsylvania, West Virginia and New York. He was formerly connected with the Columbus, O., branch of the Studebaker Sales Co.

Fred C. Meinhardt has been appointed office manager of the Milwaukee Auto Engine and Supply Co. He was formerly auditor of the United States engineers office at Milwaukee. Through a typographical error in these columns it was originally announced that Mr. Meinhardt had been appointed business manager of the company.

Captain Edward V. Rickenbacher, formerly a leading race car pilot on the American tracks has been awarded two more bronze oak leaves for extraordinary heroism, to be worn on the Distinguished Service Cross awarded him on Oct. 16.

David C. Fenner has been appointed an assistant to C. C. Hanch, chief of the Automotive Products Section of the War Industries Board. He is a member of the Highways Transport Committee of the New York State Council of Defense.



Capt. E. V. Rickenbacher Is Again Decorated for Heroism.

O. E. Harmon has been appointed manager of the service department of the Fuller & Sons Manufacturing Co., Kalamazoo, Mich. This company also announces the appointment of M. E. Fuller as employment supervisor in the employment department which was organized under the direction of Dr. Blackfor, an international employment expert.

Leslie R. Acton, president of the Power Truck and Tractor Co., Detroit, Mich., which was recently organized with capital of $2,500,000, and which has already begun manufacture of four sizes of power truck chassis, is well known in the motor industry, having been associated with several of the best known manufacturers in the country. He was at different times auditor and assistant treasurer of the Studebaker Corporation, production manager of the Maxwell Motor Co. and vice president of the Redden Motor Truck Co.



Leslie B. Acton, President of the Power Truck and Tractor Co., Detroit.

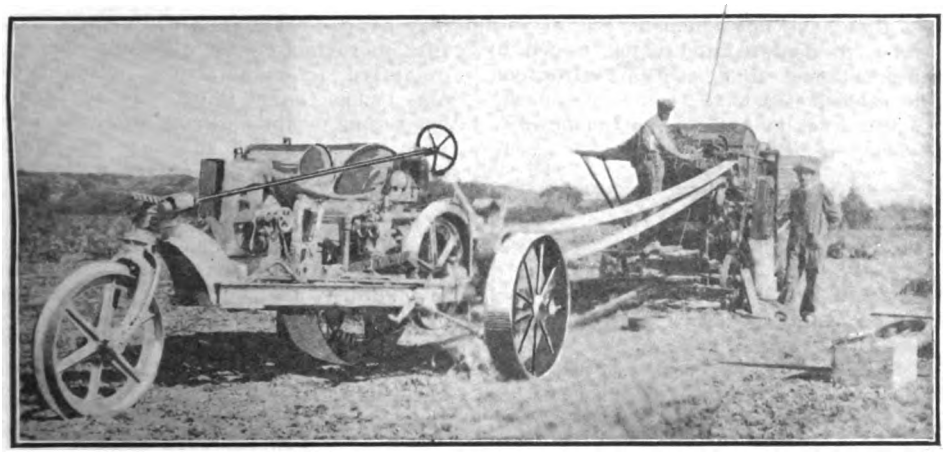
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Future of the Tractor Industry

Demand Will Equal Production—Great and Quick Growth Certain—Makers and Dealers Can Avoid Failures Met in Producing and Selling Automobile Vehicles—From an Investment Viewpoint Good Products and Good Management Should Warrant Substantial Returns.

(REPRINTED FROM TRACTOR WORLD)

FARM tractor manufacture has been approved by the War Industries Board as an essential industry. Those engaged in it have assurance of priority in distribution of fuel and materials and will be allowed whatever labor is needed to meet the production demand.



Bull Tractor Threshing Beans, Owned by D. J. McMurty, Arroyo Grande, San Louis, Obispo County, Cal., Con tracting Bean Thresher.

Tractors are needed by thousands in this country, and any surplus of domestic requirements can be absorbed by other nations. The need for food crops will be quite as great the coming year and the shortage of labor will be far more keenly realized. There is reason to believe that the experience of farmers with tractors this year will create a demand for machines that will be largely in excess of the production.

This does not mean that the tractor manufacturers will willingly limit their outputs, but certain it is that labor will be extremely scarce, and even with impartial apportioning of help that shall be available there is no prospect that more than a part of the number required can be obtained by any industry. There are some industries that must have outputs to standard, such as steel and fuel production; the farmers must raise the largest food crops in the history of the land, the railroads must be operated, war munitions must be turned out in whatever volume is required, and the ship yards must launch more vessels than ever before. But all else will be limited, perhaps by conditions, perhaps by governmental regulation.

No Prospect of Over-Production.

These facts have been referred to merely to convince those who may have interest that the farm tractor industry will not be over productive. There are wonderful prospects for the concerns that are well established and can produce machines. There is no reason to believe that there will be speculation in tractors, because they are only useful for farm and industrial operations. But the present activity and prosperity of the industry may afford camouflage for flotation of stock of companies existing only on paper, and organized for the purpose of relieving the general public of whatever cash it may be induced to part with.

There are today about 225 concerns listed as builders of farm tractors. A number of these are very large and have investments representing millions in each instance. Many others are well established and are building machines in substantial numbers, and still others are engaged in experimental and development work preparatory to active production. Several companies are now producing machines to fill government contracts and for this reason cannot accept commercial orders. No one can with any degree of certainty predict what the output of any one concern will be. Because of this fact there may be supposition that any tractor manufacturing company ought to be reasonably profitable, and that investment in stock of a company with "good prospects" ought to be productive of substantial dividends.

Prosperity May Attract Swindlers.

While there is every reason for TRACTOR WORLD to encourage legitimate business and promote the industry and the interests of those engaged in it, there is equal need of pointing out that so far as possible the people should be protected against the operations of swindlers who, with a state charter and desk room, may dispose of worthless stock principally upon the representation that there shall be large returns upon the amounts invested. Getting rich quickly, no matter what the risk, appears to appeal to all classes alike.

Statement may be made that infliction of extreme penalty for swindling will not bring about restitution of money lost. Generally speaking, those who suffer through fraudulent operations are those who can ill afford to lose. Those who have knowledge of business are seldom misled by prospects of acquiring wealth from uncertain sources. Investment in tractor and farm implement manufacturing concerns that are operating and are



Plowing a Big Field Quickly: Team of Three Bates Steel Mules, Model 10-20, Working with Gangs of Two 14- inch Bottom Plows in eHavy Land.

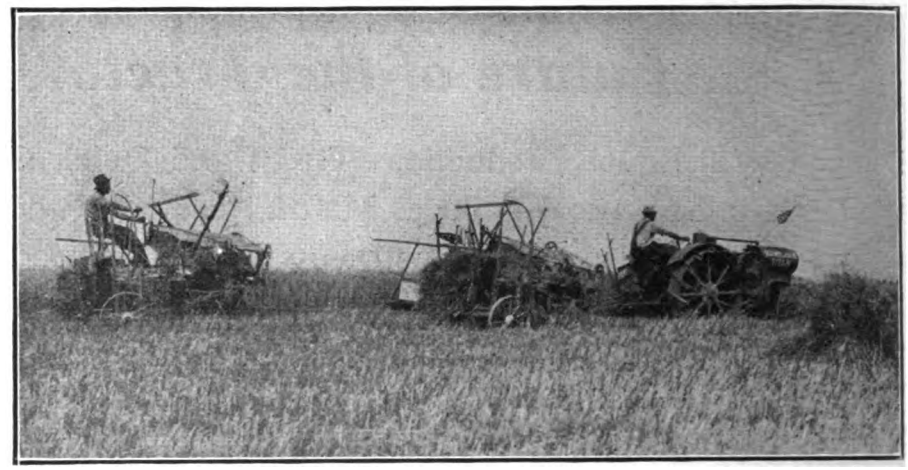
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reputable ought to be as safe as any other industrial or commercial enterprise.

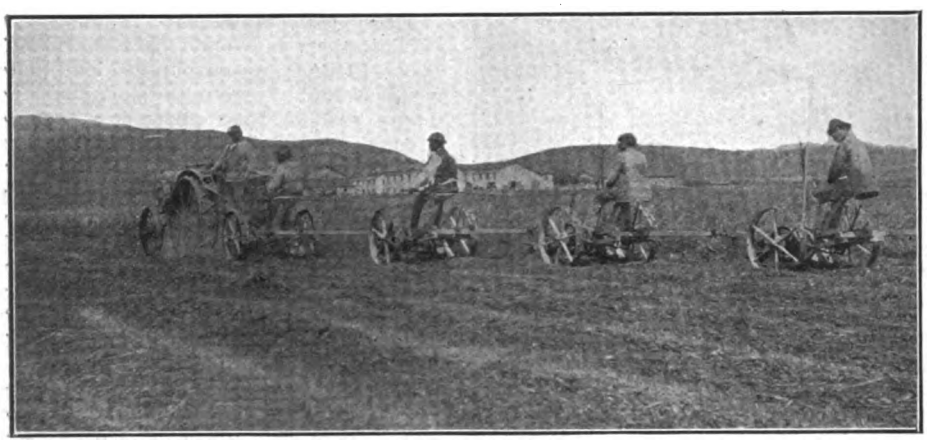
New Concerns Must Be Approved.

Today any concern promoted to engage in business, if of proportions, must have the approval of the Capital Issues Committee, a body of seven men, all of them bankers, and with one or two exceptions men of legal training, that is located in Washington. This committee is headed by Charles S. Hamlin of Boston, a lawyer, who was assistant treasurer of the United States, and it has been created by authority vested in President Wilson, who approved of the personnel of the body. The duty of the committee is to consider and approve or disapprove any proposition involving the investment of capital, so that there shall not be unwise uses made of the financial resources of the nation.

The committee has no fixed procedure. It has the power to deal with each proposition that shall come before it according to the judgment of the members, and there are no precedents or restrictions by which its authority can be evaded. It has almost unlimited power and jurisdiction, and it can rely upon the earnest support of banks and bankers, reputable business men and all others who are concerned in discouraging enterprises that are non-essential, or suppressing those that are not legitimate and can bear fullest investigation.



An I-H-C Titan Tractor Hauling Two McCormick Seven-Foot Binders, the Operator on the Rear Machine Handling Both and Observing the Work.



Reaping the 1918 Hay Harvest, Italy, with a Titan 10-20 Tractor That Drew from Four to Five Mowing Machines.

Old Concerns Must Stand on Merits.

There can be assurance that if a new concern has the approval of this committee it will be reasonably safe to invest in. But, of course, this committee has not and will not pass upon concerns that existed before it was created, so there is the need of careful discrimination by the buyer of a stock to determine the character and reputation, as well as the financial responsibility of the concern in which investment is proposed. There is, unfortunately for the investor, no measure by which the value of stock or other industrial or commercial security can be determined. Any appraisal must be based upon the actual business transactions covering a definite period.

The farm implement and tractor industries have been comparatively free from the operations of swindlers, due, no doubt, to the fact that there had not been prosperity. There is also a danger of reason to expect an unusual degree of well intentioned men organizing companies that have not sufficient capital with which to operate, and being forced by circumstances to discontinue after considerable losses have been experienced.

Reverses in Automotive Industry.

There is undoubted belief by the public that the automotive industries has been enormously successful, principally from the fact that automobiles are so generally used, but a cursory examination of facts will demonstrate that as a rule there have been many more failures than successes, and in many instances heavy loss has been suffered by investors who believed they were justified in expecting substantial returns.

To better understand this, statement may be made that from the beginning of 1912 approximately 800 different concerns organized to manufacture automobiles and trucks have failed or suspended operations entirely. Some of these were very large and had adequate resources, but the probability of returns was so remote that there was no reason to continue. During the past two years about 200 of these companies have ceased to exist, the majority of them voluntarily or involuntarily abandoning all activity. One of the best evidences of the very large number of reverses is the fact that a single concern is now making parts for upwards of 165 different makes of cars and trucks that are not now built.

Business Failures Very Numerous.

This statement does not include thousands of individuals and companies, operating as agents for manufacturers, that began business with seemingly bright prospects and have failed or have been liquidated. Were one to weigh the losses against the profits made by the automotive industry and trade there would probably be found an astounding total of losses and a surprisingly small aggregate of gain. Yet the concerns now operating are regarded as business successes, and some of them have made very large profits.

A very large proportion of the failures of the automotive trade has been due to lack of experience and willingness of



Gray Tractor Hauling Two Eight-Foot Packers and a 23-Foot Harrow, This Being a Practical and Quick Way of Cultivating.

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agents to accept used vehicles of uncertain value and varying amounts of cash in payment for new machines. There is undoubtedly large shrinkage in all "trade" or exchange transactions, and capital is very quickly absorbed by accumulations of cars and trucks that are worth but very little at forced sale. There is no reason to believe that tractor dealers will sell machines as automobile and truck dealers have, taking used and worn tractors in exchange. One might point out that "trade" sales are not profitable unless there can be a fixed value of the property taken in exchange, which is obviously not possible.

"Trade" Sales Lead to Disaster.

There is one basis for sales of new tractors to owners who want to dispose of used machines, and that is to sell the old tractor for either a fixed price or for the best offer, and charge the full amount for the new. This would even then be a reduction of profit unless a commission was obtained for the sale of the used machine, for more time and endeavor would be necessary to dispose of it than to sell a new tractor. The tractor dealer cannot expect to do business unless he makes a reasonable profit on his stock, and he cannot afford to carry large investments of capital in machines that have no known value.

The prices of the tractors are established by the manufacturers f. o. b. factories or branches and to these must be added the freights, which will vary with the distances shipped, so that the dealer has his maximum price, and he makes stated percentage of this, so that rebates, concessions, trade allowances and other shrinkage must necessarily be taken from the profits. The cost of transportation is a factor of considerable importance in price, and today the majority of tractors are built in the Middle West, Northwest and the Pacific coast, the manufacturers locating their works as near as is practical to the sources of material and fuel supply and yet be comparatively close to the largest market.

The tractor trade cannot logically be located in principal cities unless these are the commercial centers of large areas, and as a matter of fact dealers in smaller towns have a decided advantage if they are well known. Generally speaking the tractor agent who shall be most successful will be in sections of the country where the farming operations are large and the farms of considerable size. There will no doubt be some demand for machines from small operators, but not in the same measure that will be realized from those who produce large crops and have increasing need of power machinery.

During August the Detroit district exported automobiles and parts valued at $1,232,887, and agricultural implements valued at $107,325. The total value of exports from the district for the month was $28,668,564.

The Hudson Motor Co., Detroit, is to erect a one-story building, to be used for a repair shop and for storage, at its plant in that city at a cost of about $45,000.

Servis Recorder's Chart Shows All Truck Moves

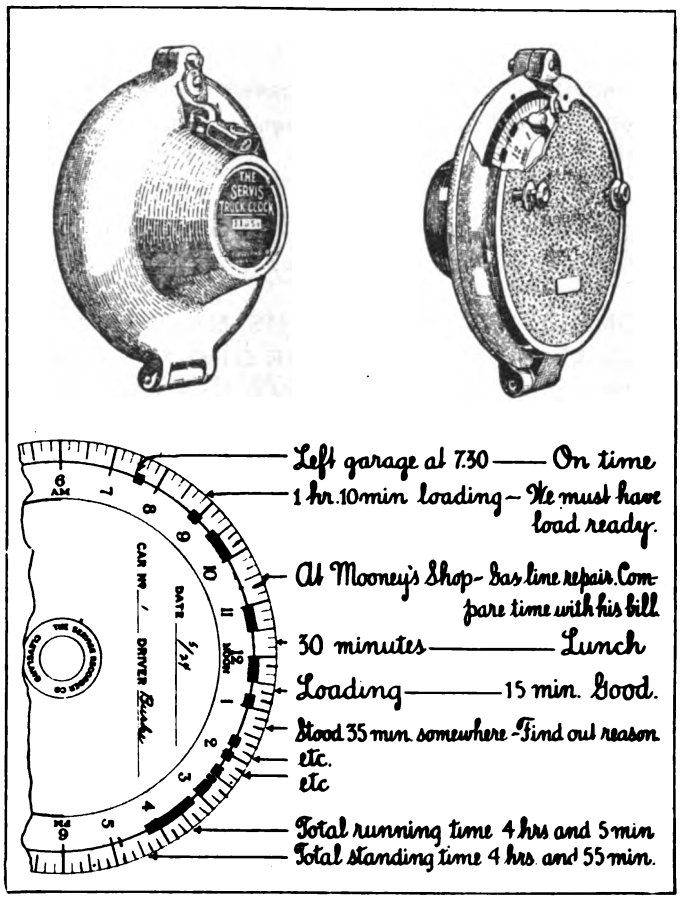
A time recording device for power trucks, just developed, which is entirely new in its principle of operation and is claimed to be proven for accuracy and certainty of record, has been perfected by the Service Recorder Co., Cleveland. It is a development from the time and distance recording instruments produced by this concern, some of which have been in use for several years.

The device is known as a Servis Recorder and it is not connected with any of the operating parts of the truck. It will indicate the time of starting and each stop, the duration of the stop and when start was again made, so that the record is complete so far as movement of the truck is concerned. The instrument is sold for $28, which is much less than the prices for which similar devices have heretofore been valued.

The Servis Recorder consists essentially of a specially constructed clock movement that is, with a marker or indicator and a chart entirely enclosed in a heavy metal case. There is no outside connection, but the device may be bolted to the truck chassis or body in any one of a dozen convenient places, and, in fact, it would indicate if it were merely carried aboard the truck.

In operation it is actuated by the side sway, which is always created when any vehicle is in motion—even in a Pullman car running on smooth tracks. The side sway causes a pendulum to oscillate and the pendulum is fitted with a steel stylus or marker which marks a travel path on a waxed chart that revolves once every 24 hours. In simple terms, therefore, the Servis Recorder is a clock which turns a chart and a pendulum (not connected with the clock, but separate from it), which by means of a steel point marks a travel path upon the chart.

After the day's run the chart is taken by the owner, superintendent, traffic manager, dispatcher, or whoever has charge of trucks, and he, by comparing the chart with the trips for the day can see, as shown in the example below, just where to begin to cut down the idle time and to increase the productive time of the truck. A simple totaling device is furnished, which quickly totals from the chart the exact running and standing time for the whole or any part of the day.



The Servis Recorder, a Newly Developed Instrument for Indicating All Truck Movements, and a Section of Chart and Note of Indication.

Another feature emphasizing the simplicity of the new Servis Recorder is the fact that it requires practically no attention. It has no pencil or pen to renew or adjust and not even a clock winding key to bother with. It is merely necessary to change the charts daily and wind. Not only is it fool proof, but it is tamper proof as well, for the working parts are completely enclosed in a strong metal case and padlocked.

It is believed that in eliminating all attachments to the running parts of the truck, such as gears, rods, shafts, etc., the big obstacle to the success of time recording devices for motor trucks has been overcome. The present instrument is simpler in many ways than a speedometer and the information it gives is of vital importance to the man responsible for the showing that the motor truck makes.

The plant of the States Motor Car Co., formerly operated by the Michigan Buggy Co., at Kalamazoo, Mich., has been purchased by the Barley Motor Co., which has a prospect of a large government truck contract. The plant has more than 250,000 square feet of floor space.

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TO JOURNAL SUBSCRIBERS

In the following pages you will find listed, priced and described, a large number of articles that are used generally by vehicle owners. With hardly an exception jobbers and dealers can supply any of the parts, fittings, accessories, equipment, machinery, or tools dealt with.

The first installment of similar articles was published in the October issue of the Automobile Journal. In the following numbers of this magazine many hundreds of these descriptions will be published and this great feature will be continued until practically all standard lines produced will be described.

In connection with the last installment a complete index will be published, giving issue and page number of the journal in which the articles and description was published. If prices or delivery conditions change in the meantime corrections will be made in the final index.

By retaining all numbers subscribers will have the most complete catalogue of desirable car equipment ever issued. It will have all the good features of a trade directory, a buyer's guide and a trade reference book.

Owing to new publishing requirements back copies of the Journal can not be supplied and we earnestly request all subscribers to file and retain copies.

IN THE DECEMBER NUMBER OF THIS MAGAZINE 200 ARTICLES WILL BE DEALT WITH AND SPECIAL ATTENTION WILL BE GIVEN TO EQUIPMENT THAT WILL ADD TO THE CONVENIENCE AND COMFORT IN THE USE OF CARS DURING THE WINTER SEASON.

Owing to the uncertanty in securing material to this time it has been almost impossible for many manufacturers to be specific in stating delivery dates. By referring to articles you will find stated at the end of practically all descriptions the delivery conditions. When that detail is not mentioned it is assumed that any reasonable demand can be taken care of promptly.

Directory of Automobile Accessories Parts and Supplies, With Descriptions, Illustrations and Prices

This is the second part of the directory of accessories, parts, fittings, machinery, tools, equipment and supplies which is being published in the Automobile Journal and Accessory and Garage Journal. Articles that are now in production or which are being carried in stock and that can be secured by jobbers and dealers are described and illustrated, and the prices and delivery conditions are stated. This information, which can be obtained through no other medium, is being compiled from the most recent advices direct from manufacturers.

Several thousand articles will be described in this way in the forthcoming issues of the two publications up to the opening of the Spring season. In the descriptions given, where no mention is made of the maker's ability to deliver goods, it is to be assumed that the same situation would exist as under normal conditions and that the article would be procurable, subject to the transportation and manufacturing considerations of the present time.

Owing to present publishing conditions, extra copies cannot be supplied, so subscription orders should be placed at once.

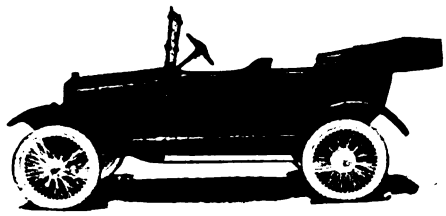
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"Amesbilt" Five-Passenger Ford Bodies have every detail and quality known to the master builder. The makers claim that the same workmanship, quality and class of material that go into the high-priced motor car built "Amesbilt" bodies are used in these Ford bodies. The seats are tilted to invite relaxation. The cushions are fitted with deep coil springs of the proper resistance to absorb road shocks and the body sets low and has

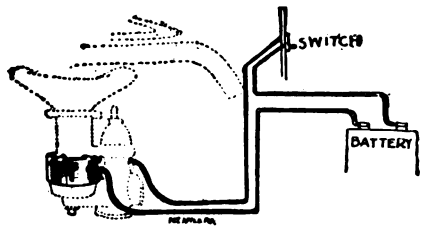


"Amesbilt" Five-Passenger Ford Body.

pure stream lines. The inside measurement from dash to back of front seat is 42 inches. Depth of cushions 17 inches. Front seat 36 inches wide. Back of front seat to back of rear seat 39 inches. Depth of rear cushion 20 inches. Overall length 122½ inches. These bodies are made in a variety of styles at attractive prices.

Manufactured by the F. A. Ames Co., Inc., Owensboro, Ky. Write for prices and literature.

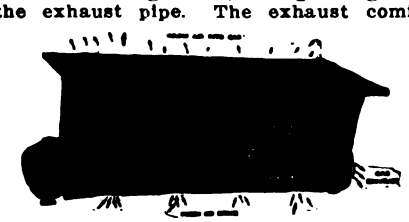
The Line Carburetor Heater applies the heat direct to the float chamber, raising the temperature of the gasoline so that when it passes into the intake manifold it vaporizes readily even though the engine is cold. The device is so designed that it can be wrapped about the carburetor float chamber and is connected by



two wires which run through a switch to a six-volt battery. When the switch is closed the heat generated by the resistance coil in the device heats the gasoline in the carburetor chamber.

Manufactured by the Mechanical Utilities Corporation, North La Salle St., Chicago, Ill. Price, $4.

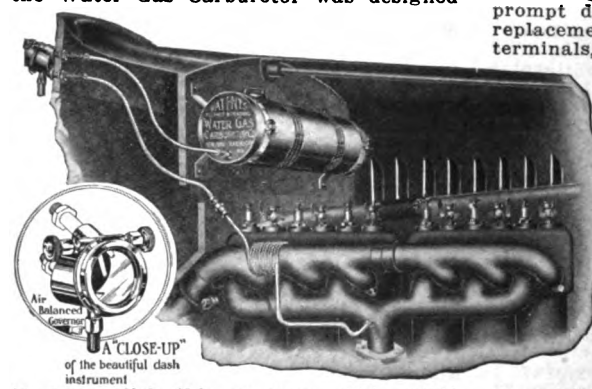
The Victor Heater for Ford Cars is one of the best known on the market, being handled by some 260 jobbers and being used on 210,000 cars according to the makers. It utilizes the intense heat from the exhaust gases to heat fresh air that is radiated inside the car and becomes effective a few seconds after the engine has been started. Following in design the same time-tested principle as in the construction of the hot air furnace, it circulates fresh air over a heated drum. This drum runs lengthwise, at right angles to the exhaust pipe. The exhaust coming



direct from the motor is turned into the drum. Fresh air circulates around the outside of the drum and is heated by the hot gases inside and rises into the car. A cone shaped spring in the drum absorbs the force of the exhaust, acts as a silencer and at the same time radiates heat outward toward the heating surface. It has no complicated parts, nothing to get out of order, costs nothing to operate and is an ornamental fixture rather than an eye sore when installed. Anyone can attach the heater in 20 minutes' time and new floor boards are furnished to eliminate the necessity of sawing or patching. Prompt deliveries.

Distributed by the Foreign and Domestic Auto Supply Co., 1765 Broadway, New York City. Price, $5.

The Water Gas Carburetor is an outfit for introducing moisture into the engine cylinders with the combustion charge as a means of producing the same ideal mixture as obtains in damp or foggy weather, at which times, as has been the experience of every motorist, the engine shows exceptional efficiency and power. This fact has been known for some time, as it was known that additional amounts of oxygen with the gasoline mixture not only made a more powerful charge, but resulted in almost complete combustion, practically eliminates carbon formations and all the troubles of which they were the cause. With these facts in mind the only problem to solve was that of perfecting a device with which the amount of water introduced into the firing charge could be carefully regulated and the Water Gas Carburetor was designed



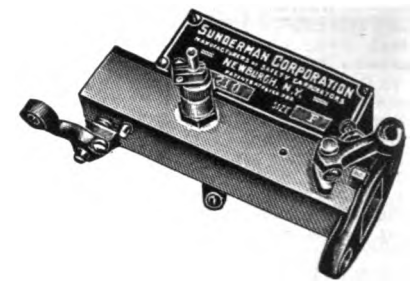
"A CLOSE-UP" of the beautiful dash instrument

to accomplish this purpose. This outfit consists of a copper tank with brackets for installation, 10 feet of copper tubing with fittings and the carburetor. Suction from the intake manifold draws filtered water from the tank into the Water Gas Carburetor, which is a double jet sight feed instrument. Controlled automatically to correct speed by an air balanced governor, the water is fed, drop by drop, through the copper tube into a coil wrapped around the hot exhaust pipe, where it becomes converted into steam and is then sucked into the cylinders through the manifold with the firing charge, assisting complete vaporization by raising the temperature, increasing the combustibility of the mixture and thereby greatly increasing the amount of power developed from a given amount of gasoline.

Manufactured by the Water Gas Carburetor Co., 347 Fifth Ave., New York City, and 1504 Grand Ave., Kansas City, Mo. Price of outfit complete, $18.

The Sunderman Vacuum Carburetor is built on the high vacuum principle which, as is known, greatly increases the evaporation and gasification of liquids. The nozzles or jets in the Sunderman are placed at 90 degrees angle to the air intake. They are tapered to 45 degrees and as the air passes over the nozzles with a 45 degree taper head, it has a tendency to create a vacuum over the opening of the nozzles. As the air strikes the tapered circumference of the nozzle heads, this creates a fan shape flow, instantly breaking the fuel into mist, so that it is readily converted into gas, aided by the high vacuum in the body of the carburetor.

The makers claim that combustion in the cylinders is so rapid that only the sur-



face of the minute fuel globules burn to furnish power and that the rest is wasted in the exhaust. Also, that in view of this fact the surface of a given volume of small globules, as furnished by the Sunderman, is greater than the surface of the same volume of liquid globules due to low vacuum, therefore the power developed from small globules is greater than from large ones, giving increased power, mileage and general efficiency.

Manufactured by the Sunderman Corporation, 9-11 Chambers St., Newburgh, N. Y. Write for prices and literature.

Universal Battery Service is a perfect, complete service for repairs on practically any battery. This service solves one of the biggest problems, as it guarantees prompt delivery on all parts needed for replacement and repairs, such as plates, terminals, connectors, separators, etc.

The Universal Battery Co., 3420 S. La Salle St., Chicago, Ill. Write for literature.

The Scientific Garage Oil Heater burns either fuel oil or kerosene and embodies a new principle of oil burning. The burner itself is wickless and sootless, and no matter how strong the flow of fuel it will give perfect combustion. It is so constructed that all heat escapes from the top and none is radiated from the sides, thus making it practical for garages where there is little space between walls and car. It is built on the principle of the miner's safety lamp by which all air for combustion is taken through a fine gauze and through which flame cannot pass. Gasoline can be poured around the

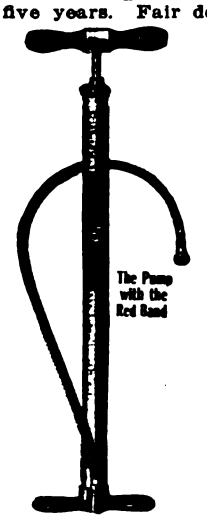


heater without danger of fire. The manufacturers claim a minimum use of fuel to heat the ordinary sized garage.

Manufactured by the Scientific Heater Co., Cleveland, O.

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The Sunderland Pump is long, smooth working and slender. The single cylinder model, see illustration, has a 24-inch stroke, enabling a frail woman to put 90 pounds pressure into a tire. It is guaranteed for five years. Fair deliveries.



Manufactured by the Sunderland Manufacturing Co., 600 W. 22nd St., Chicago, Ill. Five models—No. 10 at $2.75 is a new pump with floating piston. No. 100 at $1.40 is a single cylinder pump. No. 2 for fast action a two-cylinder pump with 17-inch stroke is $2.35. No. 3, three-cylinder, has 18-inch stroke, $4.50.

The Ever Last Resole is in fact a complete new tire without beads, and is applied over the old casing. It extends clear down over the beads and when applied to the rim it cannot be distinguished from a new tire. It is not a "sewed on" or "double tread," but is built right on over the old casing, and becomes an integral part of it. It can be successfully attached



by any repair man or vulcanizer. It is made exactly like a new tire of three plys of close woven 21½ ounce long staple cotton fabric. Each ply is treated with a heavy coat of pure rubber and the tread stock is built over this fabric body. Prompt deliveries.

Manufactured by the Ever Last Tread Co., Inc., Indianapolis, Ind.

Crew Levick Motor Oils and Greases are manufactured from crude products obtained from the Pennsylvania fields, which yield the richest grade of crude oil, and are manufactured and backed by one of the oldest and largest producers and refiners in America. They have a name in the trade of being of the very highest quality, a reputation which has been sustained by the makers for over half a century. The purchaser of these products knows what he is getting, as they come direct to the consumer in the manufacturer's regular sealed containers, which are attractive and easily identified. The oil comes in cans containing one or five gallons, while the grease is packed in containers holding 5, 10 and 25 pounds respectively.



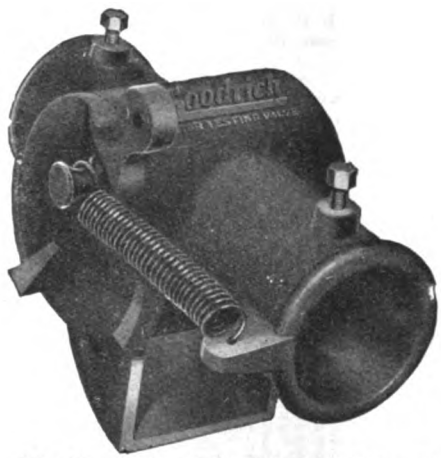
Manufactured by the Crew Levick Co., 111 N. Broad St., Philadelphia, Pa. Write for prices and literature.

The Rain-A-Way Pad is a small felt pad treated with a special solution for rubbing over the windshield. It prevents rain from blurring the vision and keeps mist from collecting. It leaves an invisible film on the glass, which sheds the water. If the pad is applied at the approach of rain it is claimed that the rain drops positively will not collect. Mist or fog are also kept from gathering even on the



coldest days. The pad is not greasy and the preparation used is non-evaporating. It slips in one of the side door pockets and is always ready for instant use.

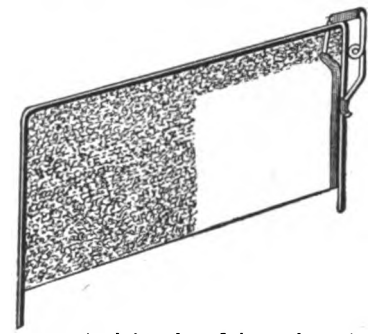
Manufactured by the Badger Manufacturing Corporation, Milwaukee, Wis. Write for prices and literature.



The Goodrich Motor Testing Valve replaces the old style cutout and produces a loud, clear, sharp note. By opening the valve the gases are freely emitted, instead of being forced through the muffler. The bell mouthed opening of the valve allows for ample expansion of the gases, relieves the engine of all back pressure and greatly intensifies the sound of the explosion. Unlike other devices it has no adjustments and is easily cleaned by removing one cotter pin. It is finished in a specially prepared paint, which prevents corrosion and rust. The valve is sold complete with pedal and pulley.

Manufactured by the Goodrich-Lenhart Manufacturing Co., Widener Bldg., Philadelphia, Pa. Ford and all 1½ inch sizes, $3; 1⅝ to 2⅜ inch, $3.75; 2½ to 2⅞ inch, $4.75; 3 inch and over, $7.50. Made in ⅛ inch sizes also.

The Woodworth Windshield Cleaner is a wire cleaner adapted to be used on the windshield of any open car. It is made of No. 4 spring steel wire, having a fine japanned finish and having a corrugated rubber tubing where it comes in contact with the glass and windshield frame. This cleaner may be snapped on the windshield in a moment and is a valuable accessory



to any motorist who drives in stormy weather. Prompt deliveries.

Manufactured by the Woodworth Manufacturing Corporation of Niagara Falls, N. Y. Price, 25 cents each. Liberal discount to jobbers and dealers.

The Howard Dustless Household Duster, unlike the old fashioned feather and wool duster, picks up the dust instead of scattering it and on smooth surfaces has a polishing effect. These results save time and make it unnecessary to dust as frequently. It is easily handled and can be used with equal efficiency on either the body or interior of the car without danger of injuring the most highly polished finishes.

The Howard Dustless-Duster, another product of the same company, is a chemically treated black cloth duster that picks up and retains dust and small particles from all polished surfaces, tapestry or upholstering, making it ideal for use about the car. It brightens and restores the original finish on polished surfaces.



The dust that it collects cannot be shaken out, but can be removed by washing the duster in hot water and soap, which treatment does not in any way impair the dust absorbing qualities of the cloth. It is economical as well as efficient, as one duster will outwear from eight to 10 pieces of cheese cloth.

Manufactured by the Howard Dustless-Duster Co., Boston, Mass. Prices: Howard Household Duster No. 14, utility size, 75 cents each; No. 15, $1; large size, $1.50. Howard Dustless-Duster No. 1, standard, 30 cents each; No. 2, office, 20 cents each; No. 3, auto, 50 cents each.

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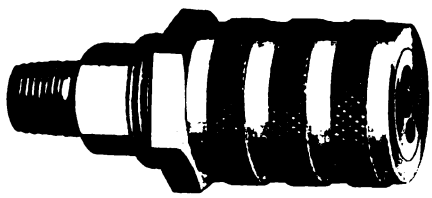
S R B Standford Bearings are a strictly high grade bearing in design, material and workmanship. It is produced from the highest grade of chrome alloy steel, is made with the same care as the regular S R B taper roller bearings. It is a bearing that absolutely prevents the rollers from going out of line. Race and cone are ground and the rollers cut to a



perfectly true taper, making the bearing run freely. It is easily installed and will withstand heavy strains. Fair delivery.

Manufactured by the Standard Roller Bearing Co., Philadelphia, Pa. Price, $10 per set.

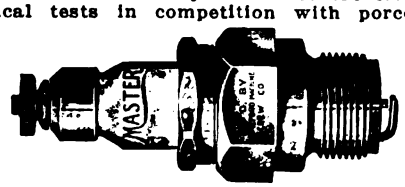
The Economy Vapor Plug is an auxiliary air valve and is attached to the intake manifold. It is adjustable in such a manner as to obtain maximum results on the engine. Once this plug is installed it works automatically at all times without further attention. It is attached by drill-



ing a 11/32 inch hole in the intake manifold just below the spread. Thread with ⅛ inch pipe tap and the plug is easily adjusted to any car's needs. Prompt delivery.

Manufactured by the Aristos Co., Warren, O. Price, $3.50.

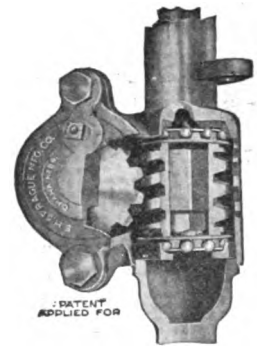
Master Calorite Spark Plugs involve the discovery of the new insulating material known as Calorite, and its adoption in the Master plug, the makers claim, has revolutionized the spark plug industry. This substances subjected to severe electrical tests in competition with porce-



lain, as an insulating material, withstood a 10 per cent. higher voltage than the finest porcelain obtainable. Every Master Plug is wrapped in felt and packed in a round box that may be carried in the tool box, without fear of breakage. Prompt deliveries.

Manufactured by the Hartford Machine Screw Co., Hartford, Conn. Price, $1 and $1.25.

The Sprague Worm Steering Gear for Ford cars appeals to Ford users because of the safety it adds to the handling of this machine. It replaces the ordinary Ford steering equipment and with this steering gear the driver can safely steer out of ruts, hold the Ford much steadier in mud or sand and he need not worry lest a bump or other bad place in the road will cramp a wheel and upset the car. It holds the Ford to the road just as the worm steering gears hold the larger cars. It also prevents locking over center. Prompt deliveries and liberal



E. H. SPRAGUE
Ball Bearing Floating Pedl
Worm Steering Gear

proposition to dealers.

Manufactured by the Sprague Manufacturing Co., Omaha, Neb. Price, $25.

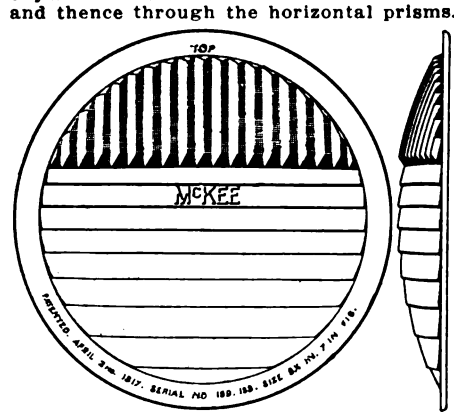
Hudson's G. L. W. Spring Oiler consists of a felt pad with an oil reservoir, contained in a rust proof polished blue metal case. This case snaps over the main leaf of the spring and is so constructed that different degrees of pressure is brought to bear on the felt pad, making the ends perfectly tight and oil proof, thus keeping the top surface of the main spring perfectly clean. At the sides the pressure on the felt is such that it permits a very slow seepage of oil, which fills the grooves along the entire side and is carried between the leaves by capillary action. The manufacturers of this acces-



sory allow a 30 days trial, with money refunded if not satisfactory. Prompt deliveries.

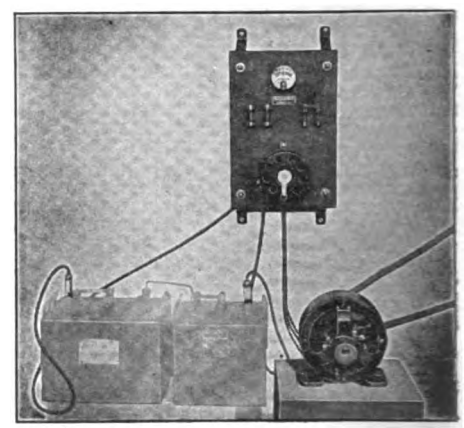
Marketed by the Hudson Sales Co. Factory branch G. L. W. Spring Oiler Co., 7 East Jackson Blvd., Chicago, Ill. Price, 30 cents.

The McKee Lens is constructed on the principal of horizontal and vertical prisms, giving a direct beam of light on the road ahead, limited to 42 inches in height, and with sufficient light to the sides to illuminate the curb and passing cars. An exclusive feature of the design is that it is concave-convex. By an arrangement of vertical prisms in a sector across the top the light which is wasted in a plain glass plate, by being thrown skyward is turned back onto the reflector and thence through the horizontal prisms.



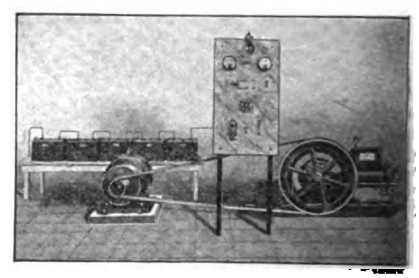
Manufactured by the McKee Glass Co., Jeanette, Pa. Prices, 5 inches to 8½ inches inclusive, per pair, $2.50; 8¾ inches to 9½ inches inclusive, per pair, $3; 9¾ inches to 10½ inches inclusive, per pair, $3.50; 10¾ inches to 11½ inches inclusive, per pair, $4.

The Main Battery Charging Outfit generates its own current and operates from a line shaft or an engine by belt drive. It charges from one to five lighting batteries at a time from any voltage from six volts up to 30 volts. The dynamo is high grade, shunt wound and of 250 watts capacity with oil ring type bearings and baked black enamel finish. The outfit consists of a slate switchboard with D'Arsonval type ammeter, rheostat, double pole, single throw knife switch, cartridge fuses, irons for mounting and two large flexible leads with large clips. This com-



pany builds a small battery charging set, which is usually driven from a gas engine previously installed in the garage or a line shaft or motor by belt, and it will care for from one to five batteries at a time. It retails at $85.

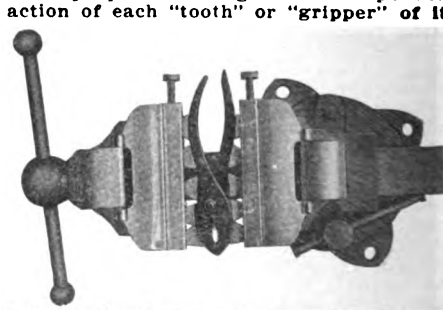
A larger set, which retails at $155, charges from one to 30 batteries at a time. Still larger sets are built in various sizes at various prices from $300 to $900 and



will operate upon gasoline, kerosene or natural gas. Fair deliveries.

Manufactured by the Main Electric Manufacturing Co., Pittsburgh, Pa.

The Universal Vise Attachment is based upon an entirely new mechanical principle. It instantly converts an ordinary square-jawed vise into a tool of a thousand purposes through the independent action of each "tooth" or "gripper" of its



jaw in clasping the form or shape upon which work is to be done. This vise is very efficient for holding irregular shapes. It is made of cold rolled steel, tempered and electrically welded and will reduce the working time by half where irregular shapes are involved. Immediate deliveries in reasonable quantities.

Manufactured by the Universal Equalizer Co., Cincinnati, O. Price four-inch set, $8; five-inch set, $9.

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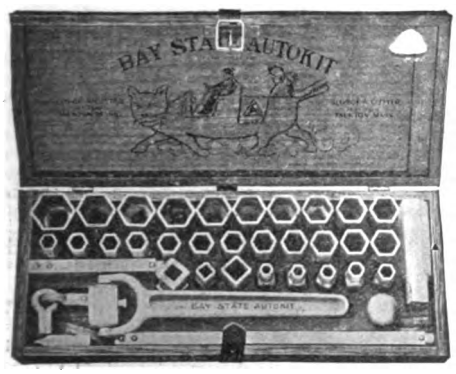
The Black & Decker Tank and Pump is a portable air tank and pump. The outfit consists of an air tank, fitted with a No. 2 lectroflater air pump, mounted on a cradle base that is supported by two large wheels and a swivel castor. A pushing handle is attached to the platform and the outfit is easy to handle and steer. The wheels are fitted with rubber



tires for use over hard wood floors or tile. When the tank is empty it is easily pushed to the nearest electrical connection and it refills itself, an automatic switch cutting out the current when the proper pressure is obtained. Prompt deliveries.

Manufactured by Black & Decker, Baltimore, Md. Price, $225.

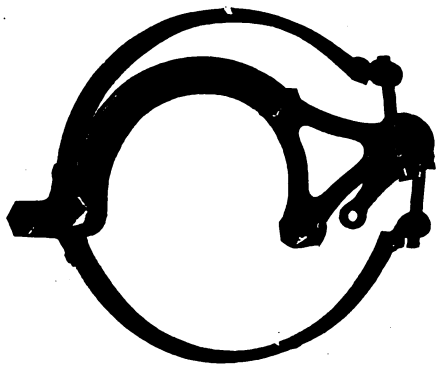
Bay State Autokit Wrenches will remove any nut, bolt or cap screw, reaching it wherever it is located, at any angle. The outfit includes an adjustable ratchet handle and shank with a series of sockets, constituting a complete combination with which every kind of work on a car can be accomplished. These tools



are of proven design and made of the highest quality material, being guaranteed 100 per cent. efficient, and as the makers claim will give extreme satisfaction in the hardest service. Prompt deliveries.

Manufactured by Bay State Pump Co., Boston, Mass. Price, $12.

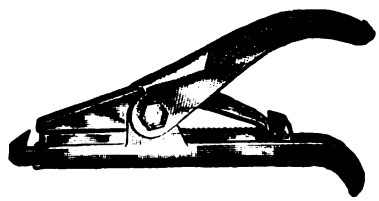
The Holdford Brake, as the name indicates, is designed primarily for Ford cars and may be used in addition to those on the car, or to take the place of either the service or emergency brake This brake is made from the best of materials, the points where the greatest strain comes are drop forgings, and the lining is J. M. Non-Burn. It is so designed as to be efficient under all conditions, bringing full contact with the external surface of the brake drum, after the first adjustment, until the lining is completely worn out. It may be connected to the foot pedal by means of an equalizing bar, thus relieving the transmission of strain and furnishing a positive brake at all times. In using it on the hand lever the internal



brake may be left inside the brake drum or thrown away, according to the car owner's pleasure. In applying the brake no changes in the car are necessary. Fair deliveries.

Manufactured by the G. H. Dyer Co., Cambridge, Mass. Price per set when applied to hand lever, $10; for application to foot pedal, $15.

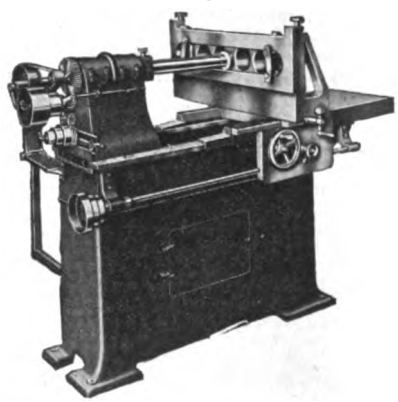
The May's Cotter Pin Puller reaches after the cotter pin, straightens it if bent and once taking hold, withdraws it in safety and holds it until released. In a garage or repair shop where much of this work has to be done, this tool will save much time and trouble. The puller is well machined, mechanically correct and is fin-



ished with a heavy nickel plate to prevent rusting. Prompt deliveries to jobbers only.

Manufactured by the Brewer Titchener Corporation, Cortland, N. Y. Price, $1.25 each.

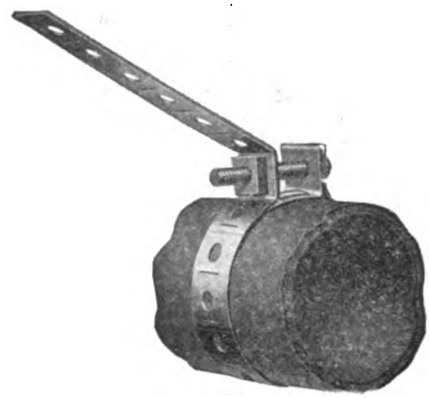
The Schmidt Cylinder Grinding Machine is designed for grinding gasoline engine cylinders from the smallest motorcycle type to a six-cylinder block 31½ inches long. The base is of the cabinet type and designed to eliminate all possible vibration. The boring spindle, which is designed for strength and rigidity, is six inches in diameter by 12 inches long and carried upon heavy bearings. The face plate upon which the cylinder block is mounted while being ground is large and heavy, and has both a cross and lengthwise feed, the latter being automatic. It is also fitted with two knurled nuts by which the plate may be raised and lowered, thus facilitating the centering of the cylinder. The length of the bed is 55



inches and the width 15½ inches. The height from the bed to the center of the spindle is 12 inches. Prompt deliveries.

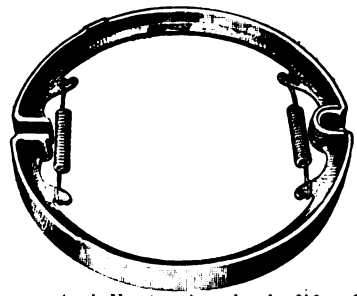
Manufactured by the B. L. Schmidt Co., Davenport, Ia. Price, $1200.

"Universal" Adjustable Hose Clamps are made from cold rolled ribbon steel with screw and nut ready to attach, and it is pliable enough to easily wrap around and conform itself to the shape of a hose or pipe. The clamp ribbon has holes one-half inch apart along its middle portion and in these holes lies the secret of its adjustment. Between these holes are perforations, which make this clamp so successful. The perforations permit the bending of the ribbon with a slight pressure of the hand or pliers, forming a seat for the bottom of the nut. After the clamp is applied and the screw fully tightened the excessive stock may easily be removed by breaking it off at the score next above the nut. Prompt delivery.



Manufactured by the Universal Industrial Corporation, Hackensack, N. J. Made in two sizes, "Senior" and "Junior." Write for prices and literature.

Brake Shoes for Fords are made in two types, one type being unlined and the other lined with asbestos, having wire insertions and riveted to shoe. The face of these shoes which are in contact with the cam are specially hardened, preventing them from wearing down out of true, and



adding materially to the shoe's life. Sold in original cases only, 50 pairs to a case. Weight, 165 pounds. Prompt delivery.

Manufactured by Adamson Manufacturing Co., East Palestine, O. Prices, unlined, 35 cents pair net; lined, 70 cents a pair.

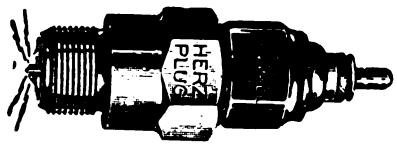
The Mosco Timer for the Ford Car requires but a minimum amount of attention. The shell is made of heavy pressed steel with aluminum finish. The insulating ring is of gray bone fiber. The terminals are insulated all the way through.



The contact arm is of pressed steel and with the brush assembly may be purchased separately. Prompt delivery.

Manufactured by Motor Specialties Co., Waltham, Mass. Price, $1.50.

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The Hers Spark Plug has a mineralized mica core, which the makers claim is absolutely oil proof. This core is a built up system of mica washers around a tightly wound tube of ruby mica, highly compressed into practically one solid mica unit, which is impervious to oil, heat and moisture. Prompt delivery.

Pro-Mo-Tor Fabricating Corp., 245 West 55th St., New York, N. Y. Price, $1.50 each.

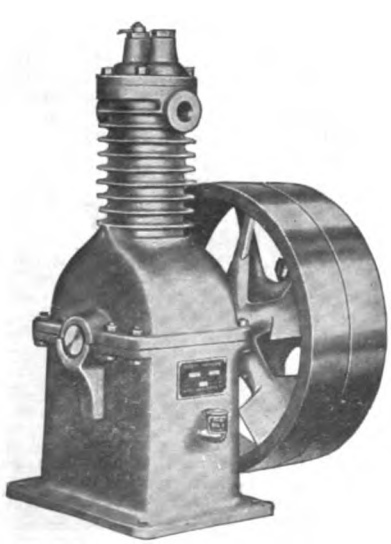
The Curtis Air Compressor has gained a prominent place in the trade, due to its patented system of lubrication, by means of which air free from oil is furnished. The difference between the ordinary splash system in use in some other machines and the "Curtis" controlled splash system may be compared to beating water from a pan with a flat stick, and then trying to empty the same pan of water with the edge of a knife blade. The first system drenches every part of the exterior of the compressor with oil and saturates the air on its way to the tire, which, as every garage man and motorists knows, shortens the life of the tire, as oil rots rubber. The second or "Curtis" system with its knife blade throwers takes from the oil bath just sufficient oil for lubrication, and the oil which reaches the cylinder is further regulated by being thrown on a pin of predetermined size so that just the proper amount for lubrication and no excess is delivered to the cylinder. None is left to work over into the discharge line.

Other features found in the "Curtis" Compressor are:

Hand unloader, which permits starting against full tank pressure without burning out the motor, blowing fuses, burning or jumping of the belt; safety cage, which prevents possibility of broken valves dropping into cylinder and wrecking the machine; fan flywheel, which throws a current of air against the cylinder, thereby assists in cooling; valves inspectable without removing the cylinder head; cylinder head can be removed without loosening a pipe connection; high and low level oil filling gauge, showing at a glance the amount of oil in the crank case; bearings of white metal, die cast, adjustable, renewable and non-cutting.

Curtis Compressors are handled exclusively through the jobbing trade. Prompt deliveries.

Manufactured by the Curtis Pneumatic Machinery Co., 1621 Keinlen Ave., St. Louis, Mo. Price from $25 up according to size and style of outfit. Made in five sizes. Each in three different styles of mounting.

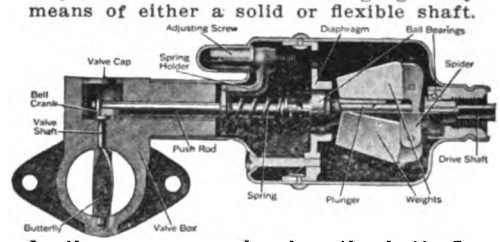


The Pierce Governor, for controlling the speed of motor cars, employs the well known principle of centrifugal force and is entirely enclosed in a housing small enough for any commercial purpose. While every part must be accurate in construction and assembly in a device of this kind, the governor is exceedingly simple. The only rotating part is the weight spider, and as this runs on ball bearings in an oil bath, it must be very



evident that the device is as wear and trouble proof as it is possible to make it. Naturally the governor requires some oil, but this is easily supplied through an oil cup in the case and is distributed to all moving parts by the weights on the spider.

The governor is mounted between the carburetor and the intake manifold and may be connected to the driving agent by means of either a solid or flexible shaft.



In the governor valve box the butterfly valve is normally in a position that does not obstruct the flow of gas, but it is closed so as to reduce the valve port area, just as soon as the motor reaches the predetermined speed. The valve is actuated by what is known as the fly-ball principle. The two weights are mounted on a spider, which revolves on ball bearings, and are so pivoted that as their velocity increases they are swung outward, forcing a plunger forward, which in turn operates the butterfly valve. The plunger is forced against a spring calibrated to a standard pressure so that as the velocity of the weights is lessened they return to normal position and the valve opens. Every Pierce governor is so constructed that the adjustment can be positively sealed by the owner of the truck, thus preventing any attempt on the part of the driver to change the speed.

Pierce Governors are now standard equipment on 89 makes of motor trucks and about 12,000 of them were furnished for government use during this year. This demand has more than doubled the gross sales in the past year and in order to meet it the manufacturing facilities have been increased 100 per cent.

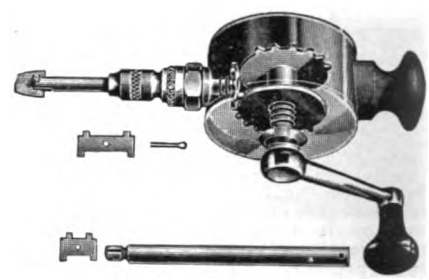
Manufactured by the Pierce Governor Co., Anderson, Ind. Write for prices and literature.

The Lawco Rim Tool removes a tire from any demountable transversely split rim in a minute or less. The tool is easy to adjust, easy to attach and will give quick results. As shown in the illustration this rim wrench is simply a set of claws that can be hooked over a rim and contracted by the simple motion of a lever. After the tire has been fixed it can be replaced while the rim is still in the grip of the tool. A toggle or reverse movement of the lever expands the tool and the rim as much as may be necessary to cause the ends to meet and permit latching. This tool may also be used to break open any rim latch. It is made of forged steel and is strong and simple in design. Prompt deliveries.

Manufactured by the F. H. Lawson Co., Cincinnati, O. Price, $3.50.

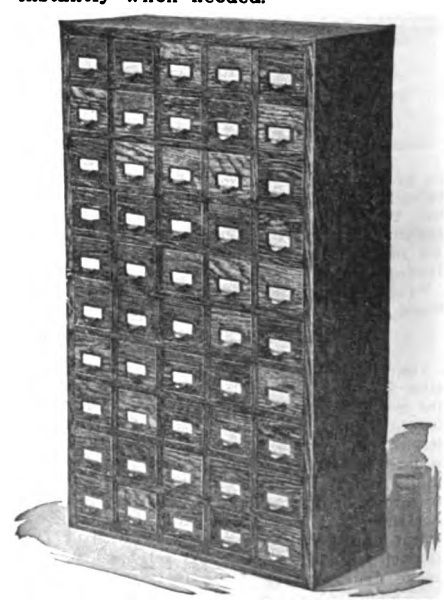


The Sioux Valve Grinder consists of a handle or crank operated wheel which drives through suitable gears the grinding tool. The gears are so arranged that by a continuous turn of the crank the tool is given a reciprocating motion, always traveling slightly forward in one direction, then in the opposite, until the whole circumference has been made. With the tool are furnished three special valve head fittings and a special length of shaft for extension purposes. Prompt deliveries.



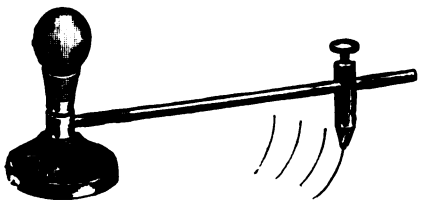
Manufactured by Albertson & Co., Sioux City, Ia. Price, $6.

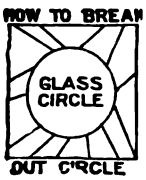
The Universal Screw Cabinet is built primarily for garage use, being designed for screws, brads, nails, nuts, bolts, auto accessories and other small articles. It keeps shelves clean and prevents duplication of stock. It will save its small cost many times in a year in providing a place where every screw or part may be put and where everything can be found instantly when needed.



The Universal Screw Cabinet is made by the Hobart Brothers Co., Troy, O., being furnished in two sizes, 50 drawers (as illustrated), $19.85, and 100 drawers, $34.60.

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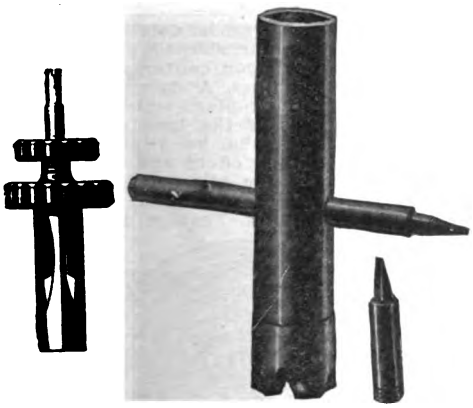
The Red Devil Circular Glass Cutter.

The Red Devil Circular Glass Cutter, No. 633. When in operation, the glass to be cut is placed on a flat surface, the base of the cutter at the centre of the glass to be cut. Careful measurement should be made and the cutter head adjusted to one-half the diameter of the circle to be cut, and fastened in place by the thumb screw. The base to be pressed down and held firmly in place by one hand and the head operated by the other, the point of beginning to be away from the body so as to give the hand of the arm operating the head an opportunity for a wide sweep. Some practice may be necessary, but the cut can be made by a firm pressure, not too heavy, and as nearly as possible by one sweep around the circle without stopping. In cutting, the base must not be allowed to slip or change position, and if necessary, two sweeps or two cuts may be made, as nearly as possible a full one-half circle in each.

The small illustration shows how to break the glass to leave the circular glass for use. Cuts are made from the outer circumference of the circle to the edge of the glass. The pieces can be broken off by gently tapping on the under side of the cuts, but away from the edges of the circle, to prevent breakage of the inner portion

Manufactured by the Red Devil Tool Works, Smith & Hemenway Co., Inc., 129R Colt St., Irvington, N. J. Price, 50 cents.

The A. & H. Valve Tool is an implement for truing up both internal and external valve and cap threads of nipples of pneumatic tires. It may also be used for cutting threads, making it a valuable addition to the tool kit.



With the True Threader Tool one can recut inside plunger threads, recut outside nipple threads and take out plungers. Prompt delivery.

Manufactured by the A. & H. Manufacturing Co., Inc., 505-507 West 45th St., New York City. The combination tools, $2.25, or $1.50 each.

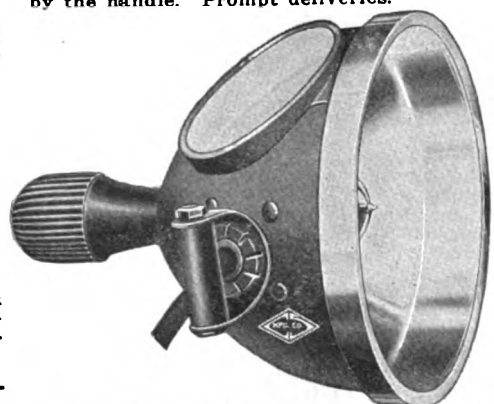
The Black & Decker Tire Inflater Outfit consists of a tank mounted upon an iron base and fitted with compressor, pressure gauge and automatic switch. Immediately upon making the electrical connection the motor is started and air is pumped into the tank until a pressure of 150 pounds per square inch has been reached, then the automatic pressure switch comes into action and stops the machine. To inflate a tire the Romort air chuck on the end of the hose is pressed over the tire valve and the pressure in the tire will rise instantly, it is claimed, to any number of pounds desired. When enough air has been used to cause the pressure in the tank to drop to 125 pounds, the automatic switch starts the motor and brings the pressure back to 150 pounds. After the first electrical connection has been made the machine requires no further attention, since its operation is entirely automatic. A cover is



furnished for the automatic switch, which completely encloses all mechanical and electrical parts. These machines can be used on 110 volt circuits, direct or alternating current of from 25 to 60 cycles. Prompt deliveries.

Manufactured by the Black & Decker Manufacturing Co., 304 Water St., Baltimore, Md. Price, $215. Write for catalogue of complete line.

The Culver-Stearns' Giant Searchlight is made of steel finished in dull black enamel and fitted with a brass, silver plated over nickel reflectors, scientifically laid out to give the best light under all conditions, and a rear view mirror if desired. When fitted with a nitrogen bulb and properly focussed, it is said to give enough light to enable one to see guide boards, numbers, etc., at practically any distance that the eye could read in daylight. The bracket is made of pressed steel and designed with a universal joint so that the light beam can be thrown in any direction. The light is controlled by a single point switch which is operated by the handle. Prompt deliveries.



Manufactured by Culver-Stearns Manufacturing Co., Worcester, Mass. Price, $6.

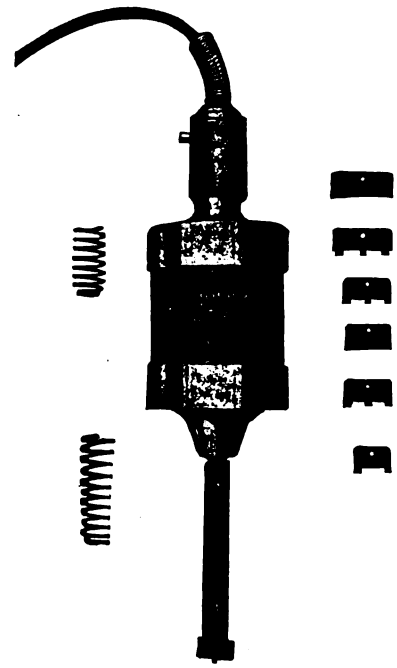


The Manley 22-Ton Universal Auto Press has a high power leverage, starting at 2200-1 and automatically increasing at the end of stroke to 5000-1. This is obtained by the lever fitting into the socket on ratchet block. The paul uses the same notches in hand wheel and tremendous pressure is obtained on the screw with little effort. An important feature of this press is that the screw being exposed at the top may be struck a sharp blow in obstinate cases, such as a rusted shaft, which pressure alone will not move.

The low power press (1000-1) leverage is 10 times quicker than a ratchet. Prompt deliveries.

Manufactured by the United Engine and Manufacturing Co., Hanover, Pa. Price complete, $105.

The Eclipse Valve Grinder is a practical and reliable electric driven machine, designed and built for the sole purpose of grinding valves to a perfect seat with the greatest possible dispatch and economy. The vertical handle with plunger switch affords perfect control, while the weight of the device (4½ pounds) is so proportioned as to secure the proper pressure



for the best results; and the smooth gliding motion imparted by the ballistic movement produces a finish to both valves and seat that is free from grooves, scratches or other evidences of poor workmanship. With this machine few valves require as much as a four-minute treatment—many are finished in one minute.

Manufactured by the Eclipse Valve Grinder Co., 1230 Lydia Ave., Kansas City, Mo. Price, $40.

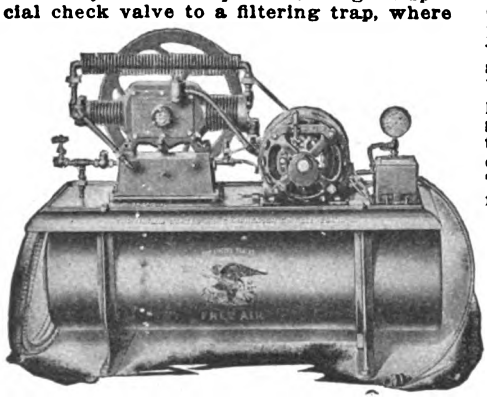
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The Red Spot Searchlight brought out by the F. W. Wakefield Brass Co., is larger in size and of greater power than the average spotlight. It is seven inches in diameter and has a 30 candle power lamp. The operator of the car may flash either a white or red beam of light from the lamp by turning a switch, making it serviceable, either as a spotlight or danger signal. Prompt delivery.

Manufactured by the F. W. Wakefield Brass Co., Vermillion, O. Price, $10.

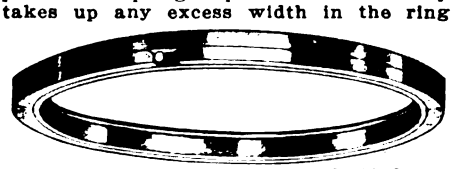
The De Luxe H 34 U. S. two-stage automatic air compressor has many exclusive features that make it an efficient and complete air plant. The air is drawn into a large area cylinder through a special intake silencer device and is compressed to 40 pounds, after which it is delivered to a smaller diameter high pressure cylinder through an air cooled pipe leading from the head of the smaller. The air is forced by a smaller piston through a special check valve to a filtering trap, where



foreign matter and oil is removed, and thence through an automatic adjustable safety valve to the storage tank. Pressure control is by automatic valve, which stops the engine when a predetermined pressure is reached falls below a given mark. Cylinders and crank case of compressor are cast en bloc. Prompt deliveries.

Manufactured by the United States Air Compressor Co., Cleveland, O. Prices furnished on application.

Pressure Proof Piston Rings completely eliminate the causes of carbon, insure perfect lubrication and restore maximum power. A spring expander automatically takes up any excess width in the ring



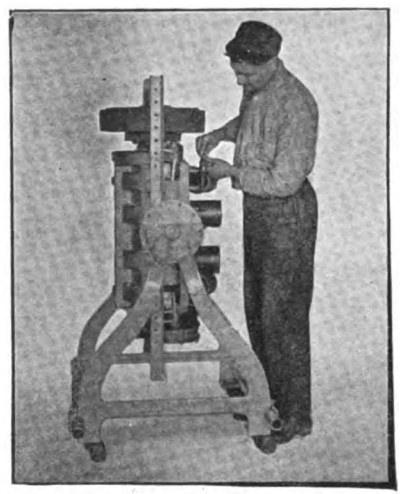
Pat. March 2, 1915, Feb. 29, 1916.

groove, consequently all possibility of either oil or gas passing between the cylinder walls and the piston is eliminated.

Manufactured by the Pressure Proof Piston Ring Co., 169 Massachusetts Ave., Boston, Mass. Write for prices and literature.

The Continental Motor Stand is universal handling the Ford engine or any three-point suspension engine from any kind of a passenger car, truck or tractor. The stand is portable and can be moved to adjust the engine in any position.

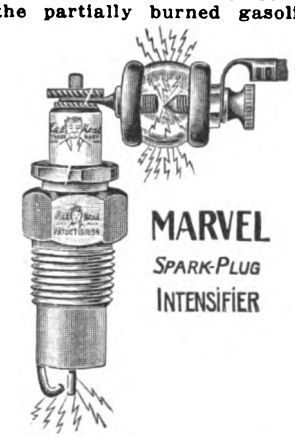
The engine is fitted to the stand in the same position that it is fitted to the chassis and all bolts and clamps necessary are furnished as complete equipment with the



stand. It is adjustable in width from nothing to 30 inches. Has a 5-inch adjustment in height and can be locked in over 25 different positions. Prompt delivery.

Manufactured by the Continental Auto Parts Co., Knightstown, Ind. Price, $50.

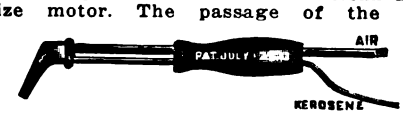
The Marvel Spark Plug Intensifier overcomes ignition trouble on internal combustion engines. The spark that is produced at the point of the spark plug when the spark gap is in series with the spark plug, results in a fatter, stronger, better spark than would otherwise be produced. The spark produced with the gap permits the use of a leaner mixture, that not only saves gasoline, but also cuts down carbon deposits in the cylinders, This is because carbon comes largely from the partially burned gasoline, re-



sulting from the use of too rich a mixture. Prompt delivery.

Marketed by Wm. Simpson, 228 S. Wells St., Chicago, Ill. Price, 50 cents each.

The Wagner Engine Cleaner, which is operated by six pounds air pressure, enables one to clean places that cannot be reached in any other way and through its use one quart of kerosene will clean any size motor. The passage of the air



through the cleaner head carries the kerosene with it in the form of a spray. Delivery 30 days after receipt of order.

Manufactured by Wagner Specialty Co., 1902 Broadway, New York City. Price, $2.

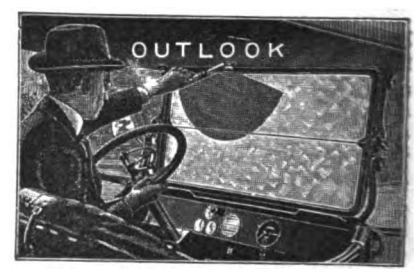
The Shurnuff Windshield Ventilator consists of two black enameled metal uprights attaching to the hinges in the center of the present Ford windshield and fastening to the cowl where the present



windshield castings are set. These uprights are so shaped as to make the sides of the shield rain proof. A metal and rubber strip is provided, which, when fastened to the cowl, makes it rain proof at the bottom, and a metal handle is also furnished for attaching to the lower sash in order that it may be pulled backward. Four small plates are furnished, same being attached to lower corners of 1915-16 and early 1917 shield only. Prompt delivery.

Manufactured by the Shurnuff Manufacturing Co., St. Louis Mo. Price, $7.50.

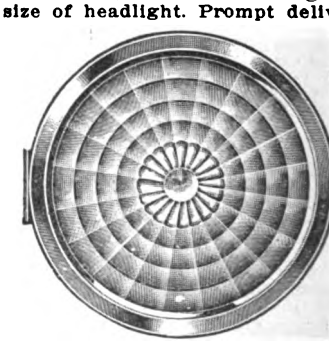
The Outlook Cleaner is attached to the windshield of the automobile. An adjustable wiper is held against the outside of



the windshield and fastened to it is an arm which may be reached from the seat of the machine. By swinging this arm through a half circle, rain, snow or fog is automatically removed from the portion of the windshield over which the wiper passes. This device is made in two styles, one for open cars that is attached to the top of the windshield, the other for closed cars, which is attached through the glass. Prompt deliveries.

Manufactured by the Outlook Co., 5525 Euclid Ave., Cleveland, O. Price, $1.50.

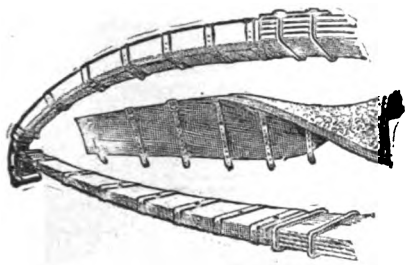
The More-Lite Lens is composed of a number of triangular shaped prisms, radiating from a common center and separated by diagonal lines. A daisy petal design is cast at the center, which adds to the attractiveness of the lens. It is designed to diffuse the headlight beams without the blinding effect and yet illuminate sufficiently for all driving needs. In either clear white or amber glass for any size of headlight. Prompt deliveries.



Manufactured by L. E. Smith Glass Co., Mount Pleasant, Pa. Prices range from $1.50 to $2.25 for clear white lenses and from $2 to $2.75 for amber.

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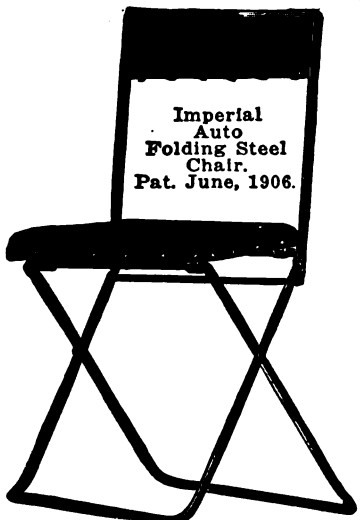
The Woodworth Lubricating Spring Covers are made of either leather or an imitation and completely enclose the springs, keeping out dust, dirt, moisture and rust and keep every spring automatically lubricated, including parts which are inaccessible to ordinary methods of greasing or oiling. This provision eliminates squeaking, gives greater riding comfort and prevents spring breakage. The edges of the covers overlap on the underside and are held in place by small straps and buckles, which permit of perfect adjustment. They are finished in black and made of the best quality of genuine leather in one style and of a good grade imitation leather in the cheaper quality. A thick felt wicking forms the lining and provides the means to hold and automatically distribute the oil. One oiling will last a year or more. Prompt deliveries.



They are made in complete sets for Fords and in seven other sizes to fit all other cars.

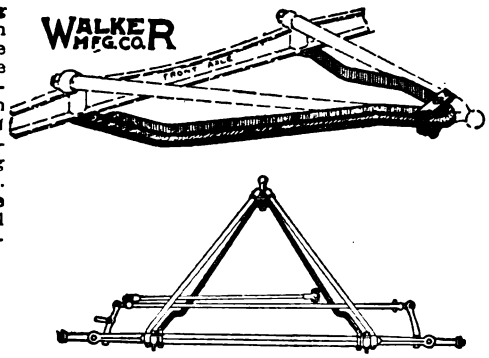
Manufactured by the Woodworth Manufacturing Corporation, Niagara Falls, N. Y. Price per cover: Leather, 14 in., $1.10; 16 in., $1.30; 18 in., $1.50; 20 in., $1.65; 22 in., $1.80; 25 in., $2; 28 in., $2.25. Imitation, 14 in., 70 cents; 16 in., 80 cents; 18 in., 90 cents; 20 in., $1; 22 in., $1.10; 25 in., $1.30; 28 in., $1.50.

The Imperial Auto Folding Chair was primarily designed for a convenient auxiliary folding seat in an automobile. It folds compactly in a small space when not in use and is an ideal chair for the camp, beach, launch or car. The seat and back rest are padded with felt and upholstered in black water proof art leather. The frame is made of special oval formed steel finished in black enamel.



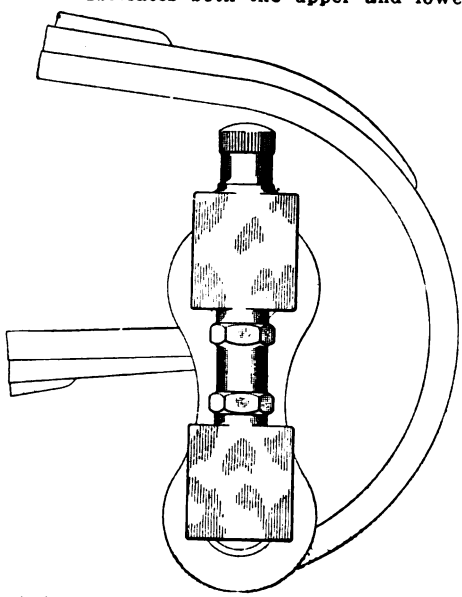
Manufactured by the Imperial Bit and Snap Co., Racine, Wis. Write for prices and literature.

The Ford Auxiliary Radius Rods for reinforcing the regular Ford radius rods also brace the front axle, keeping it straight, thus bracing and preventing the breakage of the regular rods. They are attached without drilling, for they simply clamp onto the rear of the regular rod and are fastened to the axle by using the regular Ford perch bolt. Made of solid three-quarter inch steel rods, with malleable clamp, the outfit weighs 12 pounds, and a still lighter type of angle iron stock weighing five pounds and a tubular type of the same weight.



Manufactured by the Walker Manufacturing Co., Racine, Wis. Prices from $2 to $4.

The Meckel Shackle Bolt Lubricator is secured to the side of the spring shackles and lubricates both the upper and lower bolt. It is designed to fit any make of car in place of the grease cups at present in use. A valve set in motion by the car when running permits the oil to flow and as soon as the car stops the flow of oil is automatically shut off. The lubrcators for double shackle bolts have two reservoirs, while those for single spring bolts and spindle bolts have only one. Either of these can be attached in a few minutes the manufacturers claim. One filling of the reservoir is said to last 2500 miles of ordinary travel. Fair deliveries.



Manufactured by the Meckel Lubricator Co., Lakewood, O. Prices: Style "A," double shackle bolt lubricator, $2 each; style "B," single spring bolt lubricator, $1 each; style "C," single spindle bolt lubricator, $1 each.

J. H. Williams & Co., Brooklyn, N. Y., have developed standard lines of every "Superior Drop Forged Wrenches" to meet all recognized trade needs. They now carry some 40 patterns in about 1000 sizes with openings running from 3/16 to 7⅝ inches.

Most of their lines are carried in three standard conditions of finish: Unfinished, forgings are milled only; semi-finished, forgings are milled, case hardened, black lacquered and have heads ground bright; finished, forgings are polished, case hardened (mottled color), and lacquered heads bright.

For conservation purposes as requested by the War Industries Board, this company, in common with all other leading drop forged wrench makers, have discontinued for the duration of the war the manufacture of several lines, as well as all finished wrenches. In most cases those styles discontinued are important, but they can usually be replaced without great sacrifice by one of the retained lines. While the present stock of discontinued goods lasts, however, it is available for current demand.

In order to encourage the selection and use of proper wrenches and to reduce to a minimum without impairing efficiency the stock and assortment carried by dealers and users, many "Wrench Sets" for a wide variety of purposes have been developed. These "Sets" in serviceable canvas pocket rolls, make for convenience,



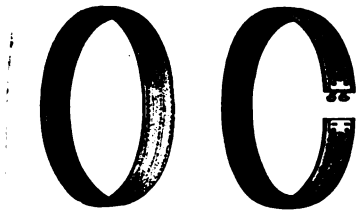
good order and neatness—they supply the tool that is wanted when it's wanted, without duplication and with no size missing.

As an instance of the efficiency of these 'Wrench Sets" note the two listed herewith: Set No. 4, Big Six, six standard wrenches for U. S., standard nuts and cap screws. Openings 7/16 to 1¼ inches, 12 sizes, no duplicates. Set Ford "A," 12 wrenches for Ford services with openings 19/32 to 57/64 inches, 13 sizes, no duplicates.



This company is operating two large plants at Brooklyn and Buffalo, N. Y., and maintains in addition a western office and warehouse at Chicago. With their large manufacturing facilities and three distributing centers they are in a position to handle promptly and efficiently not only demands for Superior Drop Forged Wrenches, but also for their machinists' tools, including "vulcan" tool holders, lathe dogs, clamps, etc.

Woodworth Fan Belts for Fords are made of a very strong inelastic webbing faced with a specially prepared leather, giving a strong grip and long wear. They are strongly made with three rows of stitching and are furnished in both endless and detachable types. This same belting is also furnished in coils for splicing with belt hooks.

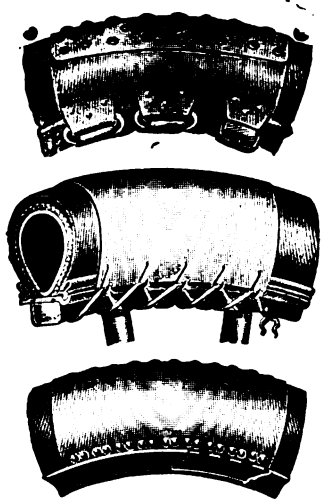


Manufactured by the Woodworth Manufacturing Corporation, Niagara Falls, N. Y Prices: Ford endless belt, 40 cents each; Ford detachable belt, 50 cents each.

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Woodworth Hook-On Strap and Lace Tire Boots are for use in strengthening casings over weak spots as a means of preventing blowouts or for placing over blowouts in emergency so that a new tube or repaired tube can be used until a new casing is secured or the old one repaired.

The hook-on type are made of heavy leather in two styles, one studded, with middle filled with flat head rivets and the other reinforced with extra strip of leather under rivet heads. The strap boots are held in place by lacing across



the rim with strong strap adjusted by buckle. They are reinforced on the center and have flat head rivets to protect the leather from wear. The lace boots, similar in type, do not have extra reinforcement of leather in center and are fastened by lacing with chrome leather lacings passing through steel hooks in the edge of boot.

Manufactured by the Woodworth Manufacturing Corporation, Niagara Falls, N. Y. Write for prices and literature.

Mistokleen is a varnish preservative which not only improves the gloss on automobile car finishes, but makes the coats flexible and lasting. It is a scientifically blended product, containing the best known polishing agents. It is applied in the most simple way, being sprayed on and after the surface has been



polished slightly, the body appears clean and bright. It can also be used to remove tar and grease from the car without damage to the finish.

Manufactured by the Crew Levick Co., 111 N. Broad St., Philadelphia, Pa. Prices: Ready filled sprayer outfit complete, $1.25; quart can of Mistokleen, $1; gallon can, $2.75.

Howe Kork Tred Transmission Lining for Fords has inlays of cork. The exclusive and distinctive feature of this lining is the air cushioned retaining cup, which is riveted in the lining and holds the cork disk securely in the fabric. As a result of such construction a pocket of air is trapped between the cork disk and the bottom of the cup, the cork disks engaging the drum first when pressure is applied to the brake pedal. The braking pressure, however, compresses the air in the cups and drives the corks flush with the fabric, thus permitting the fabric to take its full share of the wear and allowing the cork to retain its full frictional value.



When the pressure is released the compressed air in the cup brings the cork back to its original position—protruding slightly above the surface of the fabric—so that each disk possesses its entire braking value when brake pressure is again applied.

"Kork Tred" lining, according to the maker, not only eliminates all the troubles common to ordinary linings, which become smooth and slippery with wear and lose their gripping qualities, but the cork disks will not break loose from the fabric.

Manufactured by the Howe Manufacturing Co., Chicago, Ill. Price, $3 per set.

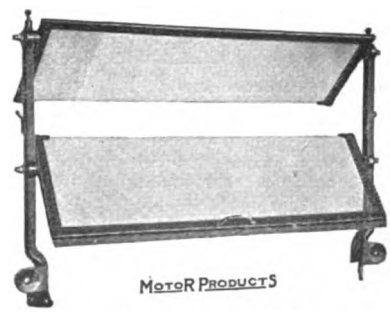
The "Liberty Bell" is different from the usual type of signal. It's tone is distinctive, clear and musical. It is very ef-



fective, yet does not offend the hearing. At the same time the signal sounds a brilliant red light flashes through the lens surmounting the bell. By this means the warning is conveyed to both the eye and ear of the pedestrian or approaching motorist. Prompt deliveries on reasonably large orders.

Manufactured by the Liberty Bell Co., Cleveland O. Prices from $6 to $14.

Motor Products Windshields in two new styles are being marketed to supply a demand from the trade for this popular type. Both have the "rani vision" and ventilation features. The passenger car windshield shown in the illustration is complete ready for attaching by simply



taking off the old windshield. It can be equipped with top fasteners if desired, which will eliminate the straps originally furnished for holding the top.

The commercial type of windshield shown is equipped either with or without the slip dash illustrated, and eliminates the stay rods which usually form a part of Ford commercial car equipment. The new shield, as may be seen, bolts directly to a straight dash. The brackets being so constructed that they hold the shield rigidly in place. Prompt deliveries.



Manufactured by the Motor Products Corporation, Mack Ave., Detroit, Mich. Prices: Model Z-17, $17; model 100, $19; model 10, $22; slip dash, $3.50 extra.

The Adamson Model E Vulcanizing Set includes vulcanizer, can of Adamson dry fuel, a box of 12 patches, measuring cup, sand paper and directions.



While serving its purpose as well as any of the large outfits for vulcanizing, it is much handier and efficient, as it can be packed away in the car among the tools or in any small space and is ready for use at an instant's notice. Prompt delivery.

Adamson Manufacturing Co., East Palestine, O. Price, $1; extra box of patches, 25 cents; extra can of dry fuel, 50 cents.

Mistokloths are individual pieces of cloth of open texture, soft and free from lint and are packed in handy packages that can be readily stored in the tool box or door pocket of the car. They fill the need that is ever present about an automobile and are particularly suited for polishing the body, as they rub dry and



polish the smoothest surface without scratching. For cleaning and polishing reflectors, lenses and other parts, work which requires an absolutely clean cloth, the Mistokloths are excellent.

Manufactured by the Crew Levick Co., 111 N. Broad St., Philadelphia, Pa. Prices: Standard size box, containing 12 Mistokloths, 50 cents; small package of six "Kloths," 25 cents.

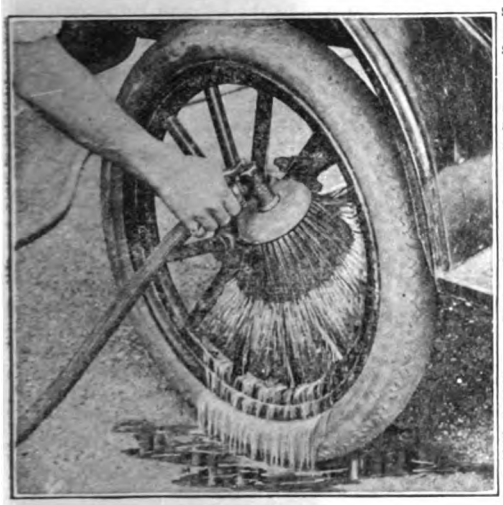
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Woodworth Easyon Chains for pneumatic tires can be quickly and readily put in place without trouble, as the car does not have to be jacked or moved, the individual chains being snapped on over the tire. Four single chains on each wheel afford traction and prevent skidding. They come packed in bags, eight comprising a set.



Manufactured by the Woodworth Manufacturing Corporation, Niagara Falls, N. Y. Prices: For 3 or 3½ inch tires, $4 a set; for 4 or 4½ inch tires, $5 a set; for 5 or 5½ inch tires, $6 a set; extra or repair cross chains, 25 to 40 cents each.

The Water Spray Auto Brush is made of the best grade of bristles, circular in shape and has a hose connection in the center through which water is sprayed. The patented part consists of an aluminum valve forming the handle of the brush and controlling the flow of water as the brush is used. As opening in the bristles enables the user to direct a spray



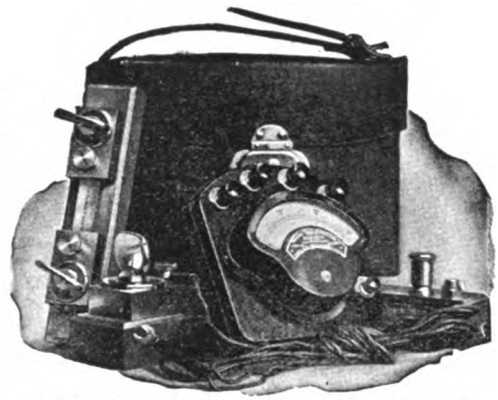
of water at a distance and increase the volume as desired.

Marketed by Scully-Jones Co., Chicago, Ill. Prices: Short handled Water-Spray Auto Brush, $8; 3-foot extension Water-Spray Auto Brush, $10; extra brushes, $3.75.

The Champion Spark Plug Cleaner consists of a glass tube containing 50 loose, hardened steel needles. One end of the tube is open and fitted with a rubber bushing into which a spark plug can be screwed in exactly the same manner as it fits into the cylinder head of the engine. The tube is half filled with gasoline, the plug screwed into the bushing, then the whole is shaken vigorously for a minute or two and the plug is cleaned as thoroughly as if it were disassembled and cleaned. When the tube is shaken it starts the needles in motion and they peck away at the inner surface of the plug where the carbon has accumulated. Prompt deliveries.

Manufactured by the Champion Spark Plug Co. of Toledo, O. Price, 75 cents.

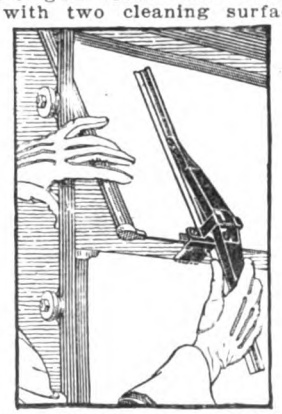
The Weston Garage Testing Instrument indicates and locates accurately and quickly the troubles to which electrical systems are liable. Among these are those attributable to deteriorated or run down batteries; short circuits or grounds at any point due to worn sockets; open circuits due to vibration, abrasion or loose lamps; leaks that result in continuous discharge of batteries; brush troubles in the motor or generators or worn commutators, etc. The Weston instrument detects these troubles and is reliable, permanent in calibration and generally serviceable. The instrument illustrated is the Weston



model 280 voltammeter, with external shunts for ampere measurements. It is pocket size, has a uniform and legible scale, is quick in action and is shielded from disturbing influences of external magnetic fields. With its six different ranges (300, 30 and three amperes and 30 and three volts and 100 millivolts) it is actually six instruments in one. The price of the instrument is exceedingly low for such equipment. The special inducements offered by the manufacturer will interest every progressive member of the trade. Deliveries contingent upon conditions.

Made by the Weston Electrical Instrument Co., 103 Weston Ave., Newark, N. J. Price, $32.50.

The Tri-Co Rain Rubber can be easily attached and readily removed, cleaning both the top and bottom glass of the windshield the full width across. Multiple faces of gum rubber make the cleaner flexible with two cleaning surfaces on



each arm. The rivets are topped with celluloid heads, so that they will not scratch the glass. One desirable feature is that the device can be removed by simply opening the glass and lifting the rain rubber off. It is made in five different models, designed to cover any type of two-piece windshield. Prompt delivery.

Manufactured by Tri-Continental Corp., Buffalo, N. Y. Price, $1.50.

The Taylor Leakage Proof Ring for Fords the makers claim does away with all loss of compression, oil throwing, carbon trouble and loss of power. The interlocking, underlapping joint makes a per-

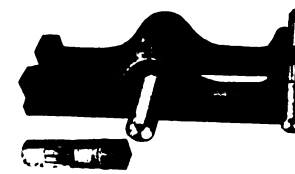


fect seal, which compression or explosion gases and oil cannot break. It is made in 3¾ x ¼ size only and is strong and durable, being ground to accurate size. It wears uniformly, having no points to break or catch carbon. Prompt deliveries.

Manufactured by the G. H. Dyer Co., Cambridge, Mass. Price, 50 cents each.

The Storm Connecting Rod Bearing Reamer Jig and Straightening Gauge has been on the market less than six months and large numbers have already been sold. By the use of this jig the connecting rod bearing may be reamed to correct size and alignment by even an inexperienced man and in one-tenth the time ordinarily required. Above all the tool has the advantage of mechanical accuracy. In other words, an inexperienced man will do more and better work with it than is possible even by an expert without it.

It is highly important even where a burning in stand is used, it being a simple matter to ream to a predetermined undersize. Thus each will be burned uniformly and without undue strain. Another advantage of the reamed bearing

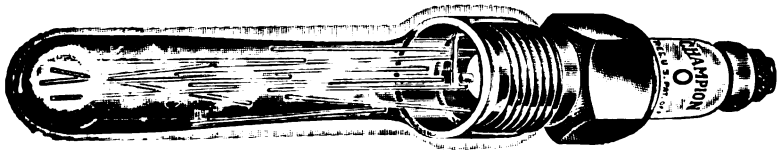


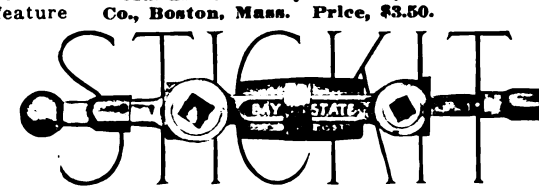
resides in the fact that any grit or foreign matter that may have embedded itself in the metal is removed, leaving nothing but the clean, pure metal. Testing surfaces and arbors enable the work man to quickly determine and correct any defect of alignment, which is of great importance and the only way to insure a good job and a smooth running motor.

Manufactured by the Storm Manufacturing Co., Thompson, Ia. Price with reamer and arbors, $30.

Stickit is a new wrench set that consists of a double end ratchet wrench and seven strong stamped steel sockets strung on a square steel shank. One end of the wrench fits the shank and the other end the sockets. The wrench also fits four sizes of nuts and with the socket 11 different sizes of nuts and cap screws. The other end of the shank has a ball stop and a spring ball for holding the socket in use in place. It is not necessary to remove all the sockets from the shank in order to use it, although it can be done in an instant. Prompt deliveries.

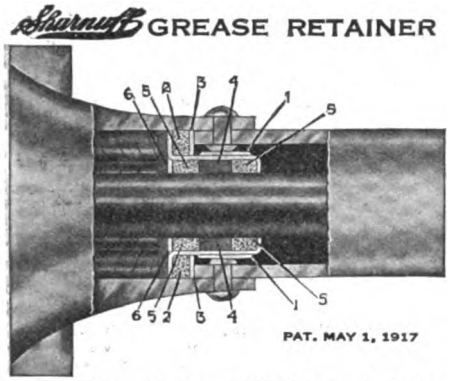
Manufactured by the Bay State Pump Co., Boston, Mass. Price, $3.50.





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Shurnuff Grease Retainer for Ford axles consists of three felt washers, one rubber asbestos washer, a cold drawn steel cup and two retaining rings. The retainer remains stationary, the two rivets that are



1. Steel Cup. 2. Large Felt Washer. 3. Large Steel Retaining Ring. 4. Asbestos Washer. 5. Small Felt Washers. 6. Small Steel Retaining Ring.

already in the axle preventing it from turning. The company furnishes a counter display free to dealers with each dozen pairs. Prompt deliveries.

Manufactured by the Shurnuff Manufacturing Co., St. Louis, Mo. Price, 90 cents per pair.

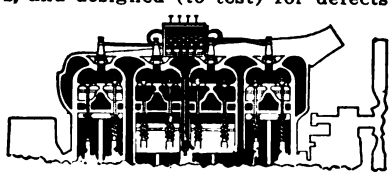
The Utility Varnish Renovator is applied with waste or cheese cloth, or by the spray method. The manufacturers claim that this cleaner will remove road tar and that it contains no chemicals that will damage the finish in any way, be-



ing non-acid and non-alkaline. Prompt deliveries.

Manufactured by Poughkeepsie Utilities Corporation, 36 Winnikee Ave., Poughkeepsie, N. Y. Prices: $3 per gallon; $1 per quart; 50 cents for 12 ounces; 25 cents for four ounces.

The Harlan Ignition and Spark Plug Tester is a device to be attached to any internal combustion engine using high-tension ignition, from four to 12 cylinders, and designed (to test) for defects in



the ignition system or the spark plugs, thereby facilitating the location of any trouble.

The tester weighs 1¾ pounds and consists of a metal frame connected to the engine head, or grounded with relation to the engine on either side. In this frame is mounted three insulated rollers, which hold the terminal connections, the center roller bearing, stationary.

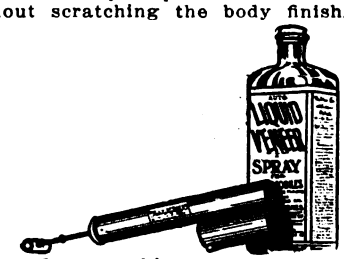
To test the ignition the bottom roller is turned downward, this action separating all the terminals at the same time, showing the sparks on their way to the engine plugs, thus instantly revealing the hot or weak sparks.

To test the spark plugs for high resistance the top roller is turned, bringing the resistance testing bar down. For testing for fouled or short-circuited spark plugs the contact members which extend above the frame are pushed down into contact, enabling one to locate the defective plug. Made for engines with 4, 6, 8 or 12 cylinders.

This tester can also be used as a spark intensifier. Prompt deliveries.

Manufactured by the Harlan Ignition Instrument Manufacturing Co., Watsonville, Cal. Prices: $8 for four cylinder type, or $2 per cylinder for any model.

Liquid Veneer, a cleaner and polish for automobiles, is applied with a sprayer and loosens the dust and dirt so that it can be readily wiped off with a cloth without scratching the body finish. Its



use makes washing unnecessary only when the car has become heavily caked with mud. It is equally effective on windshield, leather upholstery, top or body.

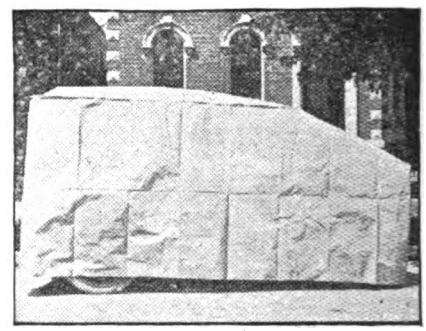
Manufactured by the Buffalo Specialty Co. Buffalo, N. Y. Price, $1.50 with L. V. sprayer.

Woodworth Easyon Truck Chains are designed to handle with ease and quickness so that they can be put in place when needed without unnecessary work and trouble and removed with the same dispatch. They are substantially made to give long service and so that the tread chain is renewable. All parts in contact with the spokes are leather covered to prevent marring the finish. They are sold singly or in sets of 12.



Manufactured by the Woodworth Manufacturing Corporation, Niagara Falls, N. Y. Prices: Small chains, $7.80 per set; medium, for tires from three to five inches, $12 per set; large, for tires from five to seven inches, $15 per set; small dual chains for dual tires smaller than four inches, $19.20 per set; large dual chains for dual tires larger than four inches, $24 per set; extra cross chains from 35 cents to $1.50 each, according to size.

The Kennedy Auto Covers are a live proposition for dealers. The season is almost at hand when car owners will store their automobiles and these cars should be protected. This company has designed covers for practically every purpose of storage. The cover protects the car from dust, dirt, cold and moisture. The makers claim that there is nothing better to put over a car for storage and the advantages of this cover are easily realized, for it also protects the tires by excluding the light and thereby preserving the rubber. The covers are made in different sizes for five and seven-passenger cars, also electrics. They are made of heavy, durable paper, that is securely reinforced to prevent tearing and which

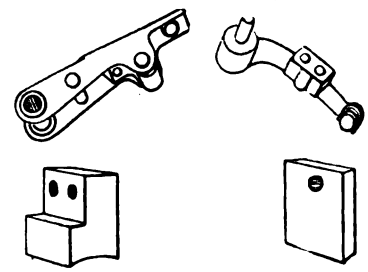


completely covers the car. There is also a cover of lighter weight paper and without the reinforcements, which gives good service when the cover is not to be used more than once. Five-passenger covers will cover the popular priced touring car and roadster with wheelbase up to 115 inches. For larger cars the seven-passenger size is preferable. Ford covers are for cars with short wheelbase. Shipped in lots of six or more.

Made by the Kennedy Car-Liner and Bag Co., Shelbyville, Ind. Write for prices and literature.

Superior Parts for all makes of ignition devices and Superior Brushes for every type of starting and lighting system are made of the very finest grade of materials, guaranteed to fit perfectly and are sent with the understanding that the full purchase price will be refunded for any part that does not give entire satisfaction.

The parts used in the electrical equipment, the very heart of the automobile, engage the attention of every automobile



dealer and repair man in the particulars of their quality and the maintenance of an adequate supply. In marketing Superior parts the makers emphasize these points: Prompt attention to every order; the making of parts from the finest grades of materials; the most attractive prices to be found in this market and deliveries when promised. These elements of their goods and service have played an important part in the huge success of Superior parts. Fiber and hard rubber insulation bushings, washers, etc., for every type of electric device used on automobiles are manufactured by this company, which also rebabbitts connecting rods for Ford, Studebaker and other engines. Prices on the latter work are in accordance with the sizes. Prompt deliveries.

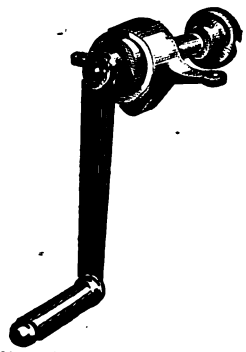
Manufactured by the Specialty Manufacturing Co., 637 Massachusetts Ave., Arlington, Mass. Write for prices and literature.

The Gates Vulco-Cord Belt, by a patented process, is built on a curve to fit the pulley. The makers claim that it positively grips, so that it cannot slip on the pulley—and will not stretch. The company makes these belts in standardized sizes, each belt carrying a label, which shows the cars it will fit, thus making it possible for the dealer to fit all the cars in his territory from a stock of eight or nine standardized sizes.

Patented and manufactured by the Colorado Tire and Leather Co. at Denver, Col. Write your jobber for literature and quantity prices.

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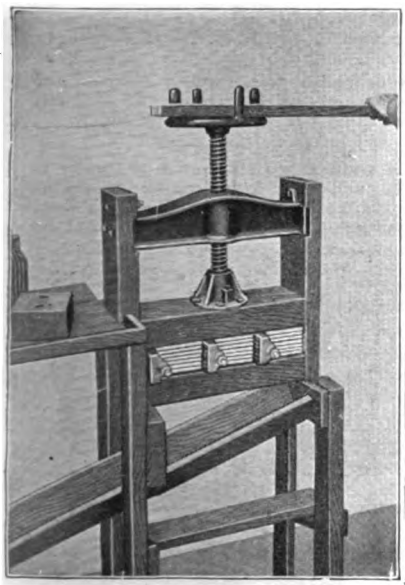
The Carson Kickless Crank eliminates the danger of injury from back firing when cranking an automobile engine. This device is sold under a forfeit of $100, which may be collected from the manufacturers in case a person using the device is injured by the kick of the crank handle. The mechanism of the device is quite simple and it is claimed that there is practically nothing to break or get out of order. It can be attached in a few minutes.



Prompt deliveries.

Manufactured by Carson Manufacturing Co. of Richmond, Va. Price, $7.50.

The Ambu Plate Press is for use in pressing the negative plates of storage batteries to reduce the bulging of the active material and to straighten the grids should they buckle. It has no metallic sections that can be reached by the dripping acid and whatever acid is squeezed from the plates runs through a trough into a receptacle so that no injury is done to the floors. It will press three groups of plates at the same time.



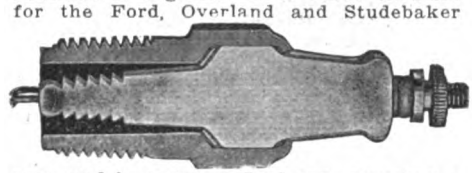
Manufactured by the American Bureau of Engineering, Chicago, Ill. Price, $32.50.

The Yankee Vise, No. 1993, is designed for various uses. It consists of a cast iron body fitted with a sliding jaw, also of cast iron, which is carried back and forth by a ⅝-inch steel screw. Both jaws are fitted with steel faces and the sliding jaw extends through a slot one inch wide in the body of the vise. The device is mounted upon a swivel base and may be removed for use on a drill press, a shaper or with other machine tools. It may be used for various kinds of work on the automobile. The space between the jaws when fully open is 3⅛ inches. Fair deliveries.



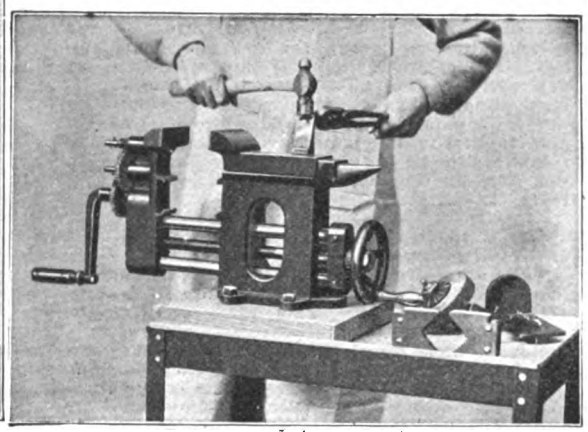
Manufactured by North Bros. Manufacturing Co., Philadelphia, Pa. Price, $7.75.

The A. C. Carbon Proof Spark Plug is a new type of this famous make of plugs and a sectional view is reproduced herewith. This plug was designed primarily to overcome the carbonizing trouble experienced in a certain tractor engine using kerosene as a fuel. The results were so satisfactory that it was decided to put the plug on the market for use in automobile engines. It is made in sizes for the Ford, Overland and Studebaker cars, and in tests on Ford cars covering a period of one year the manufacturers claim that no instance has been found where a plug was removed on account of carbonizing. The porcelain is provided with a number of ribs, having saw tooth edges which attain a sufficiently high degree of heat to burn away the carbon, thereby keeping the edges free from deposits and eliminating any chances of possible short circuit.



Manufactured by the Champion Ignition Co., Flint, Mich. Write for prices.

The Stewart Handy Worker is, primarily, a vise, but of special construction, so that many tools can be used with it. As a vise the jaws open to 4½ inches and being faced with steel, are practically indestructible. The jaw opening mechanism is operated by a hand wheel and screw, the sliding jaw being supported upon two heavy round pieces of cold rolled steel. The sliding jaw is fitted with a three-gear reduction spindle, with provision for handle upon each gear. The upper spindle extends through the jaw and is fitted with device for holding square shank drills, thus forming a drill press. Fairly good deliveries.



Manufactured by the Chicago Flexible Shaft Co., 12th St. and Central Ave., Chicago, Ill. Price, $16; $18 West of Denver.

Woodworth Steel Studded Treads are made of special water proof, non-stretching, non-cracking leather and are attached over the tire by rings over each side. They are practically puncture proof and protect the tires from all road wear and bruises and their use makes non-skid chains unnecessary for wet or muddy roads. They hug the tires closely so that the latter do not become heated or chafed from friction. When placed over old or worn out casings the latter can be made to give many extra miles of service. They are made in two styles: Center studded, with studs only on the middle portions; full studded, with studs on center and thin head rivets on side.



Manufactured by the Woodworth Manufacturing Corp., Niagara Falls, N. Y.

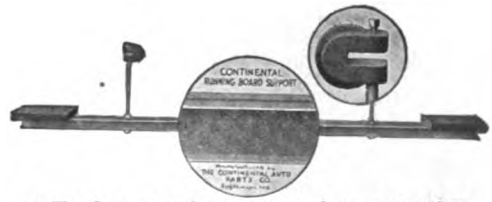
The Beach Automatic Grip Puller can be used for removing either wheels, gears or flywheels, and is so designed that when pressure is applied by turning the screw the jaws are pulled towards the common center, thus making a positive, but automatic grip.



The body of the device is so designed that the jaws are removable, simply by the slipping out of the cotter pins and cross pins, thus permitting the insertion of larger or smaller jaws. Two sets of jaws are furnished; three 7½-inch jaws which open to 10 inches, and three 12-inch jaws, which open to 18 inches. Fair deliveries.

Manufactured by the Greb Co., 202 State St., Boston, Mass. Prices, $25 east of Rockies; $30 west of Rockies. Liberal discount to dealers and jobbers.

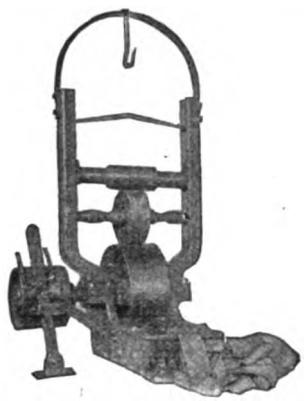
The Continental Running Board Support provides additional support to the running board, takes out the rattle and enables the owner to carry batteries, tool boxes and luggage, the weight of which would ordinarily bend the running boards out of shape. This device is a necessity to Ford cars and can be used on any other car or on trucks. Can be attached in a few minutes without drilling holes. It will fit any width and height of frame, being I beam construction, with rods double nutted. Weight, 10 pounds.



Manufactured by the Continental Auto Parts Co., Knightstown, Ind. Price $2.75.

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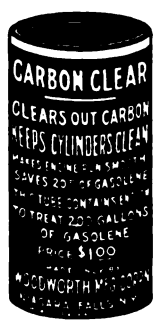
The Akron-Williams Rag Roller meets a demand from tire factories and large repair shops. It affords greater accuracy and speed in unwinding the wrappings around inner tubes after curing. The mandrel and tube are placed before the rag roller, with loose end of rag in contact with roller, then the power is applied and the rag quickly rolled off the mandrel and on to roller. The rag may be removed with ease after lifting the small rod up to hook at the top. This new roller takes up very little space and may be installed on a bench or any other convenient place near the machine for



wrapping tubes. The price is much less than the old style rag rollers and it is being adapted by many shops.

Manufactured by the Williams Foundry and Machine Co., Akron, O. Write for prices and literature.

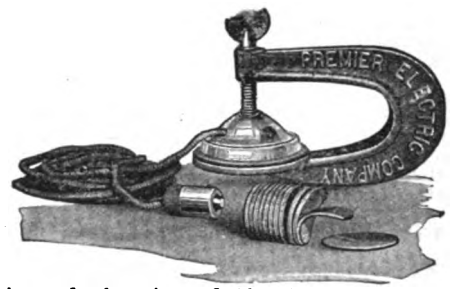
Woodworth Carbon-Clear is a powder that is dissolved in the gasoline and which the makers claim, results in the elimination of carbon deposits from the cylinders and prevents further accumulations. One teaspoonful of the powder is used to five gallons of gasoline and one tube contains 40 teaspoonfuls or enough to treat 200 gallons. It is claimed that



this amount of gasoline will give as much as 250 gallons when treated with Carbon-Clear, which contains no acid, ether, alcohol or other ingredients that will clog the carburetor or harm the motor. It can also be used in kerosene or distillate.

Manufactured by the Woodworth Manufacturing Corporation, Niagara Falls, N. Y. Price, $1 per tube.

The Premier "Its-It" Vulcanizer is one of the simplest devices for the purpose on the market and has nothing on it that is liable to become disarranged or to get out of order, there being only two parts. The heating disc has a long, flexible cord and plug attached to fit any light socket on the car and is fixed in a clamp to hold it in position. The operator simply connects with light socket; places tube in position with patch; switches on current and shuts it off in ten minutes when the vulcanization is thoroughly completed. Weather conditions have no effect upon its operation, having no exposed flame and no "extras" have to be carried to provide the heat. "Its-It" is furnished complete with clamp, heating unit, flexible cord and plug, and 12 patches all packed in carton with full directions. It



is made for six and 12-volt currents, the six-volt type being standard. When ordering voltage required and whether single or double contact Ediswan (push and turn) connecting plug is desired should be specified. Immediate deliveries.

Manufactured by the Premier Electric Co., 4032-4042 Ravenswood Ave. Chicago, Ill. Price, $1.50.

Blaxshine is jet black and of excellent covering quality, producing a black, durable finish with a shining surface like a new car fresh from the factory. The makers claim that it will stand up under any degree of heat, being especially adapted for re-enameling hoods, radiators and metal running boards. It can be put on by anyone after the car is cleaned and the enamel will dry during the night,

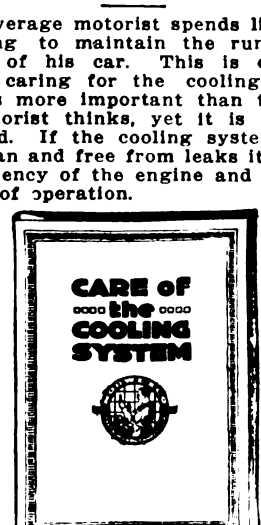


leaving the car ready for use the next day. The package includes Blaxshine for one car, fine vulcanized brush, painter's cup, mineral wood, sandpaper and your personal monogram in gold shipped by post in corrugated paper.

Manufactured by the Twin City Varnish Co., 208 N. Wabash Ave., Chicago, Ill. Price, $2.85.

CARE OF THE COOLING SYSTEM.

The average motorist spends little time in trying to maintain the running efficiency of his car. This is especially true in caring for the cooling system, which is more important than the average motorist thinks, yet it is generally neglected. If the cooling system is not kept clean and free from leaks it impedes the efficiency of the engine and increases its cost of operation.



The Northwestern Chemical Co. of Marietta, O., makers of the Norwesco line of "Chemically Correct" automotive equipment, have issued a 20-page booklet entitled "Care of the Cooling System."

This booklet is illustrated and conforms to its title, giving the motorist many practical suggestions and valuable information which will assist him in giving proper care to the cooling system. A copy of this booklet can be secured, postpaid, by writing the Northwestern Chemical Co., Marietta, O.

The Manley General Utility Garage Crane comines a half dozen different tools into one and may be used for a hundred different purposes in the garage and outside on the road. It can be mounted on a truck, chassis or service wagon for use as a general wrecking crane, or if no truck is available it may be taken apart and placed in a touring car and at the scene of the wreck may be set up in five minutes by two men. It takes up little room when in use. As a portable floor crane it will lift the front and rear ends of automobiles or transport any piece such as the engine, transmission, etc., on



its own wheels anywhere. Its capacity as a floor crane is 1½ tons; as a wrecking crane, two tons.

Manufactured by the United Engine and Manufacturing Co., Hanover, Pa. Write for prices and literature.

Eureka Grinding Compound is made to be safely used on any gasoline engine and the choice of three grades is given: Fine, medium or coarse. It is also put up





in one-pound cans, which are of the compression type, absolutely air tight.

Distributed by J. H. Faw, Inc., 37 Warren St., New York City. Write for prices.

The Mosco Valve Grinder works on an extremely simple principle. As the larger part of the grinder is held in place the handle at the side, which is attached to a chain coiled on a pulley inside the casing, is pulled slightly. The motion imparts a rotating motion to the valve tool



and the makers claim a noticeable increase in valve grinding time. The device is fitted with two tools, one standard, the other for Ford valves.

Manufactured by Motor Specialties Co., Waltham, Mass. Price, $2.

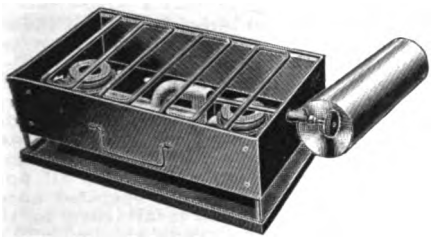
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Hercules Tops for Fords are always prepared for any kind of weather. All the materials used are carefully selected and well seasoned. The top is covered and the curtains made out of 34 ounce tan back auto rubber. Skeleton type top with natural wood bows. The rear side window is stationary and is fitted with double strength glass. The curtains above the doors roll up, working on a patented roller device and can instantly be raised or lowered. The centre metal posts on either side are attached to the Ford top irons and locked on inside of top and can be removed in about two minutes. These posts can be carried under the seats. The net weight of the touring top when crated is 200 pounds.

Manufactured by the Hercules Buggy Co., Evansville, Ind. Write for prices and literature.

The American Folding Camp Stove is just the thing for the camping or touring trip. It is efficient and dependable. Equipped with two powerful burners it uses gasoline, burning equally well outdoors as indoors. Weighing eight pounds



its size folded is 3½x8x14 inches. It is simple and easy to operate, as there is nothing to set up or assemble. It can also be supplied with heating drum. Good deliveries.

Manufactured by the American Gas Machine Co., Albert Lea, Minn. Write for prices and literature.

Bubbling Fountains may be attached to the municipal water supply in any garage and they are made in a number of styles, plain or ice cooled. The wise garage man looks to the comfort of his em-



ployees for he realizes that as long as they are satisfied they will do their best work for him. The illustration shows style number 604, which is arranged to take 75 pounds of ice.

Manufactured by the Manufacturing Equipment and Engineering Co., Framingham, Mass. Write for prices and literature.

Rusco Brake Lining is manufactured by specially constructed machinery. The basis is selected long fiber pure asbestos, expertly interwoven with tempered brass wire. No cotton or copper filling is used. This makes an extremely durable, but



soft and flexible fabric of uniform quality throughout. A secret compound is used to permeate the brake lining and render it impervious to water, oil, heat and dirt.

Manufactured by the Russell Manufacturing Co., Middletown, Conn. Write for prices and literature.

The New Era "Better" Strapless Tire Holder is an improvement over others of similar type. The construction is steel throughout with no cast parts to break and no straps to wear out or be lost. The locking device is part of the holder. No chains or cables are necessary to lock casing in place, to rattle or get lost. The tire supports are part of the holder and no unsightly straps are needed to support the tire, wear it out or permit it to be stolen. It is easy to slip the tire in place and push into position, the whole operation done in less time then it takes to fasten straps. Self-expanding, carrying



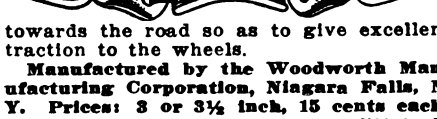
rim furnished where demountable rims are not used. It is quoted as No. 302 in appended price list.

Manufactured by the New Era Spring and Specialty Co., Grand Rapids, Mich.

No. 300 single.....$2.00
No. 301 double.....$3.00
No. 302 carrying rim.....$1.50

West of Denver add 10 per cent.

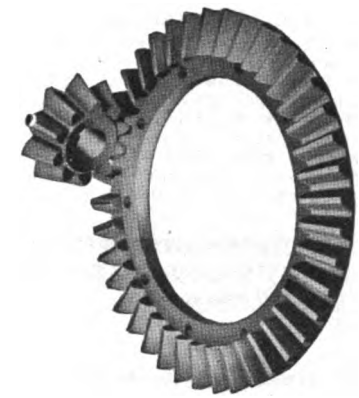
Woodworth Kant-Skid Cross Chains are designed for use with the Weed type chains and are so made as to present a perfectly smooth rounded surface to the tire that does not injure the rubber and presents the sharp edges of the metal



towards the road so as to give excellent traction to the wheels.

Manufactured by the Woodworth Manufacturing Corporation, Niagara Falls, N. Y. Prices: 3 or 3½ inch, 15 cents each; 4 or 4½ inch, 18 cents each; 5 or 5½ inch, 22 cents each.

The Krom-Nik Anderson Special Gear for Ford cars offers the lowest possible ratio for hauling and hill climbing. It has a special type of tooth unlike any other and with an additional half pound in weight it gives remarkable strength and efficiency. The 4.2 to 1 ratio offers



the lowest gear reduction possible in a Ford axle. The special racing 3 to 1 gears manufactured by this company are designed for owners who want extremely high speed for use in racing cars.

Manufactured by the F. H. & S. Co., Chicago, Ill. Price, $15.

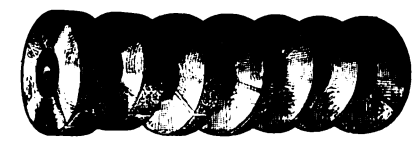
The Storm Light Weight Pistons are made of a special close grained semi-steel metal. They are made as light as is practical, often as much as 50 per cent. lighter than the original pistons furnished by the manufacturer. Yoke shaped reinforcements are used to provide ample strength combined with lightness. This light weight is a most desirable feature,



reducing vibration, stress and wear. They are finished to size with extreme accuracy, can be fitted closely and therefore are very durable. A motor provided with these pistons will give the longest and most economical service.

Manufactured by the Storm Manufacturing Co., Thompson, Ia. Write for prices and literature.

Aloxite Cloth, which is rapidly succeeding the old time emery cloth for general machine shop work, is put up in economy rolls as well as in reams, sheets and rolls.



The cloth is cut in ½, ¾, 1, 1½, 2 and 2½ inch widths, snugly wound upon spools. The operator simply cuts off a piece in any length or width he desires. The rolls are 50 yards long and are made with any degree of grit. Aloxite Cloth is also furnished in 9x11 inch sheets.

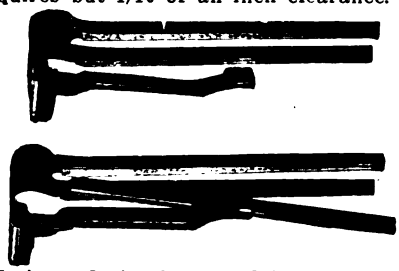
Manufactured by the Carborundum Co., Niagara Falls, N. Y.

Harvey Springs have been so well proven by actual experience that there is absolutely no question in the minds of garagemen and car owners as to their pre-eminence in strength, resiliency, endurance and all around dependability. There is a Harvey jobber with a large stock of Harvey springs on hand in every state in the Union, and it is his business to see that your order is filled and shipped by the fastest route whenever you call.

Harvey Spring and Forging Co., Racine, Wis. Write for copy of Spring Book, giving valuable information.

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The Auto-Scope Windshield Wiper cleans both sides of the glass at the same operation. The inside wiper is made of heavy absorbent felt, yet not so heavy as to cause undue friction and drag. The outside wiper is made of the best grade squeegee rubber, guaranteed not to scratch the glass. The whole device may be placed either at the top or between the glass sections of the shield, since it requires but 1/16 of an inch clearance.



It is made in three models: The Auto-Scope Junior with no rear wiping member, finished in black enamel; Auto-Scope No. 1 in oxidized finish for both front and rear of glass, and the Auto-Scope No. 2, designed similar to No. 1, but made of steel, heavily coppered and nickel plated. Deliveries in 30 days.

Manufactured by the White Lock Co., 1241 Michigan Ave., Chicago, Ill. Price, Junior, $1; No. 1, $1.50; No. 2, $2.

Evr-Lastin Gear Compound is a gear and chain lubricant that is the result of many years experience in developing lubricants. It is composed of five products that make a strictly distinct lubricant for the lubrication of transmission and differential, bevel, spur or worm gears. It is dark in color and very tenacious and it clings to the surface of the metal under heavy pressure. The makers claim that it is only necessary to pour into the gear housing one-third the quantity of this



lubricant that is ordinarily required and thus a large saving is accomplished. Furthermore, it is claimed to last pound for pound, three or four times as long as the ordinary transmission oil or grease. Prompt delivery from stock.

Manufactured by the Imperial Oil Co., St. Louis, Mo. Prices: 5-pound tins, $1.50; 10-pound tins, $2.75; 25-pound tins, $6.50; 50-pound tins, $12; ½ barrel (wood), per pound, 22 cents; barrels (wood), per pound, 20 cents; ½ barrel (steel), per pound, 24 cents; barrels (steel), per pound, 22 cents. Special discounts.

Eagleine Motor Oils and Gear Oil. Lubricating oil for internal combustion engines must be of the proper consistency, so that it flows freely and holds its viscosity, with a certain percentage of the resistance particles of the natural oil extracted and yet not too great a percentage of the lubricating base of the natural mineral oil removed, which gives it its quality for efficient lubrication. To ascertain the proper proportions in the refining of as near perfect a lubricant for gasoline engines as possible requires long years of experience. Eagleine motor oils were put through the most exhaustive tests for a period of 20 years and now have reached the zenith of perfection. They are refined from the natural mineral oil and contain no animal or vegetable

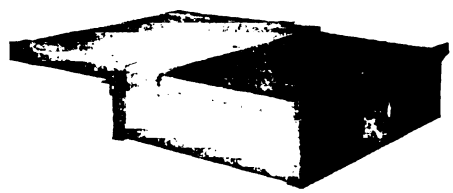
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EAGLEINE

fats that tend to decompose into glycerol and acids, which lower the lubricating efficiency. Eagleine gear oil is especially compounded to the exact consistency for efficient lubrication of transmission and differential gears and its use has shown that there is less wear on the gears and thereby upkeep expense is reduced to the minimum.

Eagleine motor oils and gear oil are put up in the company's trade marked containers that serve the purpose of cleanliness and convenience in use, as well as assuring the customers no spurious substitutes.

Eagleine motor oils and gear oil are prepared and marketed by Eagle Oil and Supply Co., 44-5-6 India St., Boston, Mass.

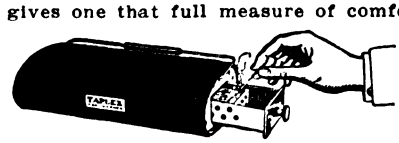
The "New Britain" All-Steel Bench Drawer is designed to meet the needs of those whose requirements do not demand the wooden back, bottom and front. A hem of triple thickness around the upper



edge and the welding of all joints combine to produce a drawer of remarkable strength and durability. With the common type of bench now almost universally used, having a thinner back plank than front one, an open space is left between the back plank and the ordinary type of drawer invites pilfering. In this drawer, however, a solid sheet metal top, prohibits any tampering at the rear and prevents a block or a lockout through wedging of the contents. In addition it serves to exclude any oil or water that might by accident soak through from above. The slideways are integral with the top and give to the drawer a smooth, free movement without binding or a cramping tendency. The handle is of generous size, with a shape of special design, which affords a very comfortable hand hold. A cylinder lock of good grade with two individual keys is provided. Master keying may be had if desired at cost. The drawer is sold as a unit, requiring no fitting, easily installed and quickly inserted without any cutting of bench. Weight in shipping order 40 pounds. Prompt deliveries.

Manufactured by the New Britain Machine Co., New Britain, Conn. Price, $7.50.

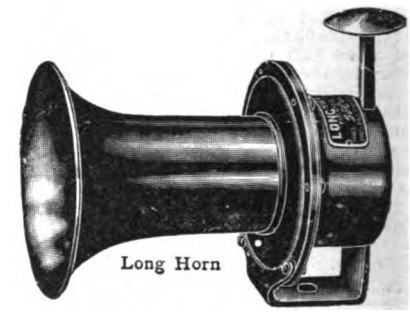
The Taplex Foot Warmer is for use in the automobile, camp, porch and for all other outdoor uses. On the coldest days it gives one that full measure of comfort



and protection which makes the automobile ride a pleasure. It is lighted with a match and the fuel burns without flame or smoke, thus making it absolutely safe. The case is made of indestructible steel with nickel plated ends and a double asbestos lining.

Manufactured by the Taplex Corporation, 47 West 34th St., New York City, N. Y. Weight 5 pounds. No. 14, $5; No. 20, $7.50. Extra fuel, 12 bricks to a box, $1.

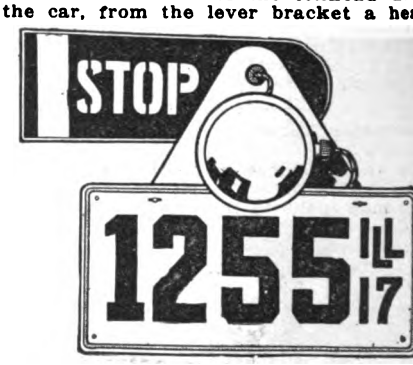
The Long Horn shown in the cut is both ornamental and durable. The contact between the diaphragm and the rotor is made by steel rollers inserted in the rotor, which is of hardened steel. Their action on the diaphragm gives a rolling tone peculiar to the Long Horn. The volume of sound may be varied from a long, low rumble to a loud, sonorous crash, and continues after power impulses have ceased. It is finished in three styles: All black, black and nickel and black and brass. To-



tal length, nine inches. Length of bell, 6¼ inches. Fair deliveries.

Made by Edward A. Cassidy Co., Inc., 280 Madison Ave., New York City. Model 3, $3.50.

The Comer Auto-Stop Signal, an invention by Mr. G. Comer, a conductor on the Illinois Central, understanding the efficiency and positive dependency of the semaphore signal of railroad block system, conceived the idea that such a device properly operated and installed upon a motor car would solve the "safety first" problem and especially eliminate all possibility of not signaling if operated automatically. The device is attached to the tail light post or license bracket and a coil cable with strand pull cable passing through a lever attached by six screws to the floor board of the tonneau under the car, from the lever bracket a heavy



strand cable is bolted to the foot brake rod by means of a lock bolt. The slightest pressure on the service foot brake takes up the slack and before the brake bands tighten up to the point of slowing the car down the red semaphore arm raises to a horizontal position, thereby immediately and automatically giving a signal to the man behind. Provision for night operation is provided by an electrical bulb (two candle power) installed within the housing of the semaphore arm and by means of a contact screw inside the axle of the semaphore when coming to a horizontal position automatically makes contact and lights, signaling the word "Stop" brilliantly illuminated to the man behind and which can be seen and read for 300 feet. Immediate delivery.

Eastern Sales Agents, Bucyous-Eastern Sales Co., 201 Devonshire St., Boston. Manufacturer's Agents, Wonder Sales Co., 616 Hippodrome Bldg., Cleveland, O. Price, $15.

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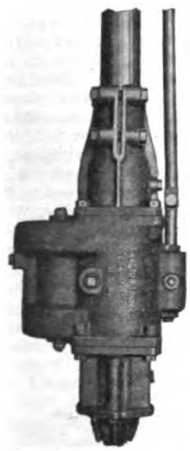
The Advance Automobile Accessories Corporation is introducing a transmission lining for Ford cars that can instantly be identified by a white stripe running along the center. In a folder headed "Another Triumph of America's Genius," this lining is described as setting a new standard in transmission fabric quality. A treatment has been worked out by the chemists of the Advance institution which resists and neutralizes the action of hot oil on cotton fabric. Moreover, a mechanical method of applying the treatment to the woven fabric also has been successfully developed, with the result that White Stripe solution thoroughly saturates every fiber of the lining, making it retain its heat and oil resisting qualities longer than any lining now on the market.



White Stripe Lining is to be marketed both in rolls and strips of three to the box. The retail price per box of three, east of the Rockies is $2, and from the roll the retail price is 32 cents per foot.

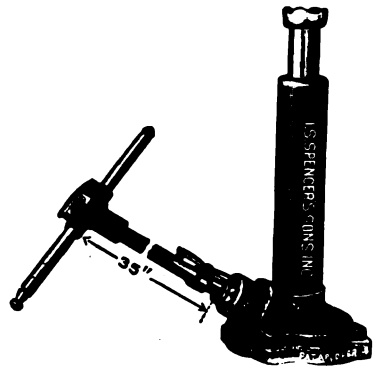
Manufactured by the Advance Automobile Accessories Corporation, 56 E. Randolph St., Chicago. Write for prices and literature.

The Moore Transmission is merely a matter of increased leverage; as, for instance, it is easier for a man to lift a given weight with a lever 20 feet long than it is with a lever 10 feet in length. Due to this steady flow of power the strain on the engine mechanism is very much lessened because the impulse of the engine is blended thoroughly before the power is transmitted to the back wheel.



As all parts of the transmission are properly designed and machined there is no difficulty in installing. Roller bearings are used throughout and are easily obtainable for replacement purposes and are the bearings which have been found most satisfactory for Fords. This transmission enables the driver to adapt his car to any kind of road conditions from paved streets to mud holes, deep sand and hills.

Manufactured by the Tractor Train Co., 1346 Wall St., Los Angeles, Cal. Write for prices and literature.



The Acme Automobile Jack may be operated from the end of the longest car without soiling the clothes, the outstanding features being ball thrust bearings and a large base area. All working parts are enclosed in a dirt and grit proof case and they run in heavy grease. The lift screw is ⅞ of an inch in diameter.

Manufactured by I. S. Spencer's Sons, Inc., Guilford, Conn. Price $6.50.

Carborundum Valve Grinding Compound is one of the standard products proved by time. This product is made to be safely used in any gasoline engine and the choice of three grades is given, coarse, medium or fine. It is put up in from one

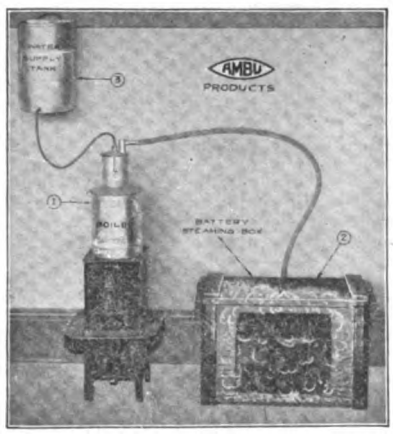


to five-pound cans and is growing more popular with discriminating manufacturers, engineers, garage dealers and repairmen.

Manufactured by the Carborundum Co., Niagara Falls, N. Y. One pound can, $1.25. Five-pound can, $5.

The American Bureau of Engineering has just put a product on the market called the Peers Ambu Battery Steamer, an apparatus for softening the sealing compound on starting and lighting batteries.

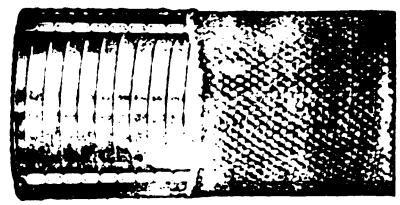
The device consists of three parts: A steam generator, a steam box and a water supply tank. When a battery is to be opened the connectors are first removed and the battery then placed in the steaming box and steam passed into the box for about 15 minutes. This makes the sealing compound soft, so that it can be removed readily with the point of a screw driver, or putty knife, the entire operation of opening the battery being performed within five minutes after it is removed from the steaming box.



The generator or boiler is made of heavy galvanized iron, the water in this unit being automatically kept to a low level so that steam is generated very quickly.

Manufactured by American Bureau of Engineering, 1018 Wabash Ave., Chicago, Ill. Write for prices.

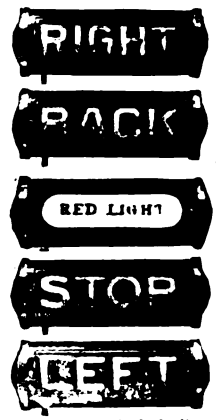
"Triplexd" Gasoline Hose uses the highest quality hose cord in its fabric cover, which is woven on with a circular loom, laying the fabric on the rubber under a pressure of 330 pounds to the square inch, so that it bites right into the rubber, which is pressed still closer around the metal lining. This metal lining, the makers claim, is the most flexible construction ever devised. The steel strip is



made of best quality slow-rolled metal of accurate, uniform thickness and heavily electro galvanized, forming a gasoline hose that is non-leakable and durable.

Manufactured by the Metal Hose and Tubing Co., Brooklyn, N. Y. Write for prices and literature.

The Roedding Signal Tail Light is housed in a cylindrical shaped metal case, 10 inches by four inches. The makers claim it to be the simplest of the many signaling devices upon the market. Its operation is controlled by a toggle button mounted upon the steering column. When the button is pressed in the central position the horn is blown. When pushed to



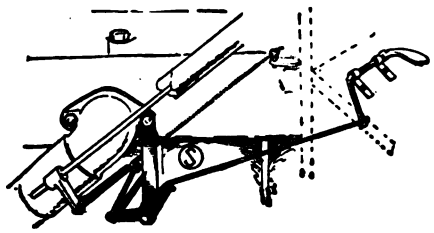
the right the letters "right" appear, two inches in height on a roller, which is inside the water proof case. When pressed to the left the letters "left" appear and other positions signal "stop" and "back," showing accurately the direction the driver intends to take.

Sole distributor, K. G. Barkoot, Detroit, Mich. Price, $18.

Woodworth Lock Chains are ideally designed for locking spare tires to the holders or for locking the front wheel to the frame to prevent the car from being stolen. They are steel chains covered to prevent chafing the paint and are fitted with locks for connecting the ends. Prompt deliveries.

Manufactured by the Woodworth Manufacturing Corporation, Niagara Falls, N. Y. Prices: Leather covered, case hardened, with high grade lock, $2.50 to $2.75; same without lock, $1.10 to $1.25; imitation leather covered steel chain with high grade lock, $2 to $2.25; same with cheaper lock, $1.40 to $1.65; same without lock, 45 to 50 cents; black coated drill covered steel chains with good cheap lock, 65 to 75 cents; same without lock, 35 to 45 cents.

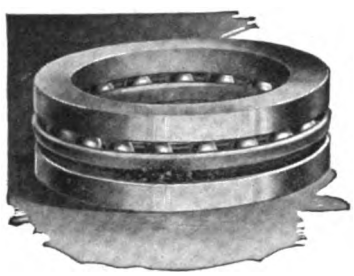
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The Stewart Foot Accelerator is designed for the Ford car and can be actuated with a minimum amount of effort. This device is extremely simple to apply and requires no alterations in the present machine, except the boring of a three-quarter inch hole for admitting the foot lever. The accelerator may be placed in any convenient place on the floor boards or dash and with the exception of the pedal all parts are located out of sight beneath the hood.

Manufactured by F. W. Stewart, 1402 Michigan Ave., Chicago, Ill. Write for prices.

Roll-Rite Ball Bearings for Fords and Chevrolets automatically take up the side grinding or side thrust movement and dissipate it into a moving anti-friction ball bearing, and by so doing not only prevent side grinding, but allow the present bearings to continue to function properly. A set contains four complete bearings, two of which fit perfectly into each front wheel in conjunction with the present bearings, thus giving four bearings to each wheel, and are in contact with the present bearings, only a felt washer and metal container being removed. The



balls in this bearing are held in place by rivetless metal retainers, causing a perfect alignment, preventing crowding together, and allowing each ball to operate independently of the others.

Manufactured by the Roll-Rite Manufacturing Co., Charleston, S. C. Write for prices and literature.

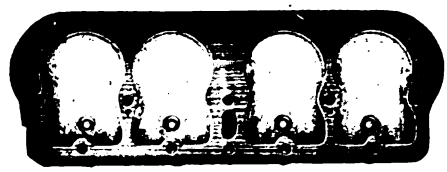
The Gordon Sectional Overlap Lazyback Seat Cover makes a good fit under all conditions. The section to cover the back of the seat overlaps on each of the arm rest sections and is greater or less as the case may be. A misfit is impossible the makers claim, the lacing at the bottom preventing wrinkles, as should one appear the lacing is again adjusted to the proper tension. The overlap relieves all strain



on fabric and fastening because of its flexibility permitting each section of the cover to conform to the movements of the upholstery without strain.

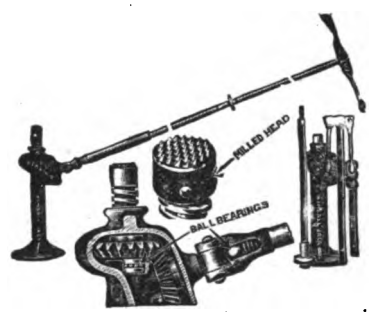
Manufactured by the J. P. Gordon Co., Columbus, O. Write for prices, samples and literature.

Never-Leak Gaskets combine two standard cylinder gaskets made of copper with a layer of asbestos fabric between the surfaces. These gaskets are carefully made and reinforced at the vital points. They may be obtained for a great number of standard cars and are cut to fit, requiring no alterations. The same firm also manufactures gaskets for practically every part of the engine where packings are necessary.



Manufactured by the Fitzgerald Manufacturing Co., Torrington, Conn. Write for catalogue and prices.

The Kimball Ball Bearing Heavy Type Jack eliminates dirty, hard jack work. Its long handle turns and raises or lowers the heaviest car with ease. Its rigid handle that is swung from the top, not the bottom, prevents it from falling over while being placed beneath the car and all the raising or lowering is done at the



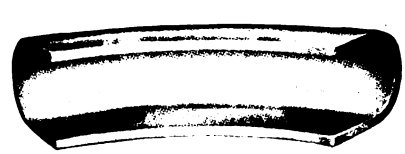
Kimball Jack

end of the long handle. The milled head of hardened steel on the top will hold anywhere, on any bolt, spring or clip. The ball bearings carry the lift and thrust, reducing the friction and making the jack work easily. There is nothing to get out of order and the entire jack folds up into a small bag. Prompt delivery.

Distributed by Edward A. Cassidy Co., Inc., Madison Ave., at 40th St., New York City, N. Y. Write for prices and literature.

The Williams Solid Reducing Shell enables the repair man to use larger sectional molds for vulcanizing repairs on small casings, whenever the small molds are busy, by lifting a shell into a large mold.

The shells being machine finished to a minute degree of accuracy and being in perfect contact at all points, as good a cure is secured as by direct contact of tire with mold.



These shells enable the repair man who has various sizes of molds to double the amount of vulcanizing on small size tires.

Manufactured by the Williams Foundry and Machine Co., Akron, O. Write for prices and literature.

The Howe Searchlight Display Stand shown in the accompanying illustration is a familiar sight in the stores of the many dealers that handle the Howe products. It is handsomely lithographed in red, white, blue, gray and black, and provides space to show styles of the regular Howe Searchlights No. 9 and No. 5, retail price $6.50 and $5.50 respectively, and also

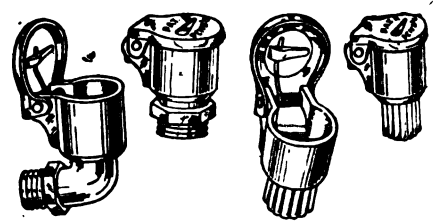


the Howe Junior, a single shell, popular priced Howe model selling at $4.50. On this stand are displayed also six of the seven clamps by which the bracket of the Howe is attached to any windshield frame, round, square or oval, with a perfect grip.

This display stand for counter or window display, together with a set of windshield clamps, is furnished free to Howe dealers. This practical connection between national advertising and the retail dealer has resulted in a great deal of interest and to it a large number of sales have been directly traced.

Manufactured by the Howe Manufacturing Co, Chicago, Ill.

Rex All Enclosed Oil Cups have many special features and are designed to meet all needs and incidentally overcome the many objections to the old style cups. They are made with a one-piece shell and easily opened and self-closing cap or lid,



which is actuated by a spring, which is enclosed without obstructing the bore. This spring being constantly lubricated it will not rust or stick. The cups are dust as well as rain proof and may be painted without affecting the mechanism or action. They are made in all sizes and are guaranteed as to construction and action.

Manufactured by Frank X. Devlin, 100 Warren Ave., East, Detroit, Mich. Write for literature and prices.

Simplex Grease Gun loads and ejects grease in 30 seconds. It is simple to remove the lower cap, insert the gun in the grease and pull up the plunger. Slip off the outer sleeve and the gun comes out as clean as a whistle, all the superfluous grease being left on the outer sleeve. The gun itself can be handled without the



least danger of soiling hands or clothing. Deliveries in 20 days.

Distributed by the Hinrichs Manufacturing Co., Chicago, Ill. Price, $2.50.

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Making Exclusive Contracts for the Sale of Goods

By ELTON J. BUCKLEY.

Here is an interesting communication regarding the legality of limited sales contracts:—

Tyler, Tex.

I beg to hand you inclosed herewith all papers relative to an order for ———, the exclusive sale of which I accepted for my city and placed an order for the same through a Dallas (Texas) jobber, who also has the exclusive sale of this article for the State of Texas. At least when I placed the order with the factory salesman, who was in company with a salesman for the jobber, I was told by the factory salesman that the jobber had the exclusive account for Texas.

Attached to the inclosed papers is a letter from the jobber, which, in a way, declines to acknowledge the exclusive sale contract. They are honorable jobbers; I have had quite a lot of dealings with them and know they are very conscientious.

Now the question that is interesting me is, can I legally make a contract that will absolutely protect me in the sale of a line of goods like this one? If I go ahead and faithfully comply with my agreement to the letter, can I collect damages from the concern making the contract with me when other merchants are allowed to get the goods either direct or through jobbers?

I base my conclusion that such contracts are legal on the fact that I am at the present time, and have been for many years, handling the exclusive selling agency for three lines of goods in my store, and although several attempts have been made by both jobbers and retailers here to bring prosecutons against the concerns with whom I have contracted for these exclusive sale lines, nothing has ever been done by legal proceedings that has interfered with me in the handling of these goods.

Quite a little while ago I handed to the manager of one of our local jobbing concerns an article that appeared in one of our trade journals of a sister state showing a Supreme Sourt decision that where a jobber had refused to sell to a merchant other than the one with whom he has placed his line in an exclusive sale way, and the case was decided in favor of the defendant, the court saying that any firm or corporation owning goods or other things of value, had a perfect right to sell the same to any one to whom they pleased, or they could refuse to sell to any one if they wished to do so.

When the jobber refused to regard the exclusive sale order, I wrote him protesting, and have a reply stating "we would carry out the arrangement with you to the letter, except for the fact that we cannot legally enter into an exclusive sale contract under our state laws."

S. V. G.

The question is: Can a manufacturer or jobber legally make a contract giving a buyer the exclusive right to sell his product in a given territory?

The answer is: He can, if the article involved is in regular commerce, not monopolized by anybody. He can do it with coffee, or tea, or muslin, or sewing machines, or a brand of clothing or an automobile. He can do it anywhere in the United States, including Texas, though the law of that state on the subject is somewhat mixed.

The only state in the Union, so far as I know, which has a statute forbidding exclusive sales contracts is Texas, but the courts don't all seem to follow it. In one case involving the sale of a brand of beer a Texas court held an exclusive contract void under the act which declared that "any agreement or understanding to refuse to buy from or sell to any other person any article of merchandise, produce or commodity, is a conspiracy in restraint of trade."

But in another case in Texas, also involving the sale of a brand of beer, another court held that it was not illegal under the very same act.

No other state has such an act, so far as I have seen, and the general law on the subject is accurately expressed by the following decision in an automobile case, which holds, incidentally, that such contracts aren't even against the law of Texas:—

The Cole Motor Car Co., an Indiana corporation, entered into a contract in Indiana with a citizen of Texas for distribution of its car in certain designated counties in Texas. The contract provided for invoicing to the distributor at prices fixed in advance by the company, and a commission to be paid to the distributor on each car sold. The contract also contained a clause to the effect that the distributor should have the "exclusive right to sell Cole motor cars" in the territory named. In a suit against the distributor for a balance due on cars delivered to him, a defense was set up that territorial restriction in the contract rendered it void as violative of the Texas anti-trust law. It held that the transaction constituted a consignment, involved interstate commerce and must be determined by the anti-trust laws of the United States rather than the anti-trust laws of Texas. The conclusion is reached that neither of these laws is violated. The agreement did not restrict trade. There are a multitude of other companies from whom purchasers can readily obtain motor cars varying in little, if anything, from the perfectibility of the car made by the plaintiff company. It is common knowledge that most, if not all, of such motor companies avail themselves of similar arrangements.

It is clear, then, that A, a manufacturer in New York state, and B, a dealer in Pennsylvania, can enter into a legal contract by which B is to have the exclusive right to sell A's product in B's territory. There is not the slightest doubt about the perfect legality of such an agreement, provided no monopoly is involved. Monopoly doesn't mean a monopoly of a brand—every owner of a brand has that—it means monopoly of the entire supply of a commodity. There would be a monopoly if a manufacturer making and controlling 90 per cent. of all automobiles made in this country should make exclusive sales contracts.

The Cole motor case was decided under the Clayton anti-trust act, the latest national law against restraint of trade. The Clayton act provides that it shall be unlawful to sell on condition that the buyer shall not sell competitive goods, "where the effect may be to substantially lessen competition or tend to create a monopoly in any line of commerce." But in another section the Clayton act protected exclusive sales contracts which did not restrain trade by saying, "nothing herein contained shall prevent persons engaged in selling goods, wares or merchandise in commerce from selecting their own customers in bona fide transactions not in restraint of trade."

So much for exclusive sales contracts made between parties in different states and thus under Federal law. As to the status where the parties making such contracts are in the same state, I believe it is equally clear that A and B could make a legal contract if they were in the same state, though as I have said, the law in Texas is not uniform. There are many cases which say so, and practically none that say the contrary, unless there is some evidence of an intent to build up a monopoly, not of the brand, as I have said, but of the general supply of something.

In other words, a man has a complete monopoly of "silver" corn, or "nobby" clothes, or the "Ford" automobile. He can sell whom he likes and as many or as few as he likes. Nobody can question his right to do so, where the only trade he restrains is the trade in his own brand.

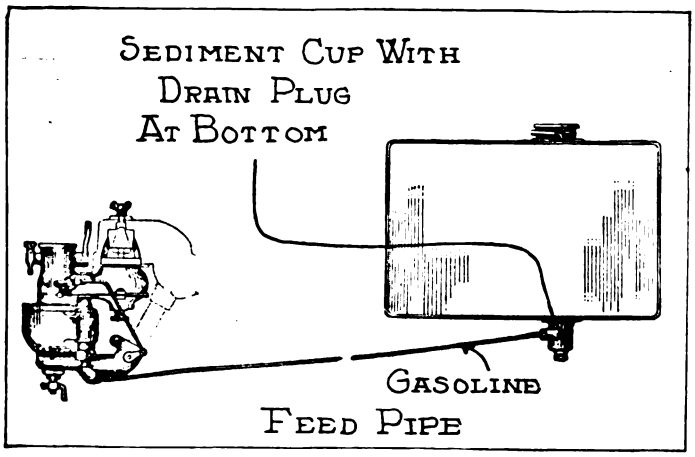
(Copyright, October, 1918, by Elton J. Buckley.)

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Standard Gasoline Feed Systems

THE following discussion of the several methods by which gasoline is fed to the carburetor is not intended to draw critical comparisons between the systems in vogue, but rather to acquaint uninitiated motorists with the principles of operation. The systems now generally used may be classified as gravity, pressure and vacuum.

The gravity system is based upon the law of nature that



Illustrating the Gravity Feed System of Fuel Supply.

liquids seek the lowest level. This system is extremely simple and a question often brought up as a consequence is, "Why is it not universally adopted?" If an automobile were always to travel on level roads it would prove the ideal method of gasoline feed, but inasmuch as there are steep grades to be negotiated there are several objections to its adaptation. This is because as the car climbs a steep hill the tank at the rear is lower than the carburetor and consequently the gasoline does not flow forward.

Early Systems Were Troublesome.

In the early makes of machines, when the storage tank was nearly always located in the rear, fuel feed troubles were very common; because of the distance between the tank and the carburetor it required only a slight grade to check the gravity flow. The trouble has been generally overcome by placing the tank further front, generally under the front seat, and when in this location only the very steepest of grades are apt to stop the flow of fuel.

With the advent of starting and lighting systems, space was needed for installing the storage battery and consequently some designers incorporated the tank in the dash, while others moved it to the rear of the chassis. Other reasons for many manufacturers changing the position of the tank are that the public desired more storage space and the tank could not be located sufficiently high on the underslung models. Advocates of this system state that simplicity and readiness are its chief advantages. The disadvantages are that the fluid is apt to splash through the vent hole in the filler cap and that when filling the tank, if any gasoline is spilled, it either runs on the seat, on the engine or down the side of the car.

In the accompanying illustration is shown a general type of gravity feed gasoline system. The tank is located under the front seat. The sediment cup or separator, shown at the bottom of the tank, serves for collecting foreign matter that would otherwise be carried along with the gasoline into the carburetor.

Designers who changed from the gravity system usually located the tank at the rear of the chassis, forcing the fluid to the carburetor by air pressure. Many methods are utilized to accomplish this end, but the principle involved is invariably the same. One of the first methods to be adopted was to utilize the pressure of the exhaust, but because of a great many difficulties this system gradually gave way to a positive air pump usually driven by the engine.

Illustrated herewith is the gasoline system used quite generally. It consists of a gasoline tank located at the rear of the chassis, a line leading from the tank to the carburetor, a pressure pump on the dash and an air line that connects at one end to a power driven pump and at the other end to the storage tank. Two pounds air pressure is required to force the gasoline from the tank to the carburetor. This is obtained in two ways, either by the hand pump located on the dash or by the pressure pump operated by the crankshaft of the motor.

How to Use Hand Pump.

Under ordinary driving conditions the power driven pump produces sufficient pressure, but when fuel has been placed in the tank it will be necessary to use the hand pump to obtain the initial pressure. Before attempting to use the hand pump, the handle of the small cock located just below the pump handle must be turned to the right, so that it is pointing straight across the car. When the pressure has been raised to the desired amount, as indicated by the gauge located near the pump handle, the handle of the cock should be turned at right angles, so as to point downward. By turning the handle to the left so that it points directly across the car, the pressure in the tank may be reduced.

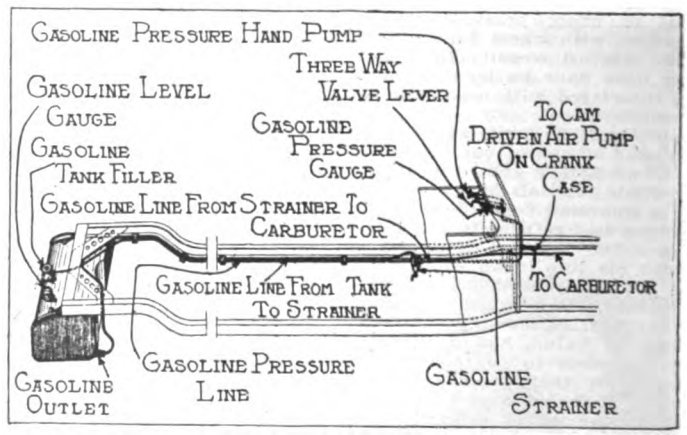
The air pressure system insures a positive feed to the carburetor regardless of the position of the car. Its only disadvantages are that the initial pressure must be produced by the hand pump and frequent inspection of the system is necessary to prevent air leaks.

The next and last system to be described is the vacuum feed, of which the Stewart is a good example. With this system the main storage tank is usually carried at the rear of the chassis, from which the fuel is transferred by suction to a small auxiliary tank near the engine. From here the fluid flows to the carburetor by gravity. The vacuum system is the latest development and is not difficult to understand, as the principles involved are but elementary.

Principles of Vacuum System.

In the accompanying illustration is shown the vacuum tank. It consists of two steel shells, the inner one of which contains the float and valve mechanism, attached to the cover. The inner shell is connected to the gasoline tank, the intake manifold, and is open to the atmosphere by means of a vent tube on the dash. The outer and larger shell connects only to the carburetor and the atmosphere. The two tanks are joined by a flapper check valve in the bottom of the inner shell.

In operation, when the float is down, the suction valve is open and the atmospheric valve closed. The suction of the motor is now communicated to the inner shell, creating a partial vacuum, and drawing gasoline into the tank from the main reservoir at the rear of the car. As the tank fills the float rises, until at a certain point the springs close the suc-

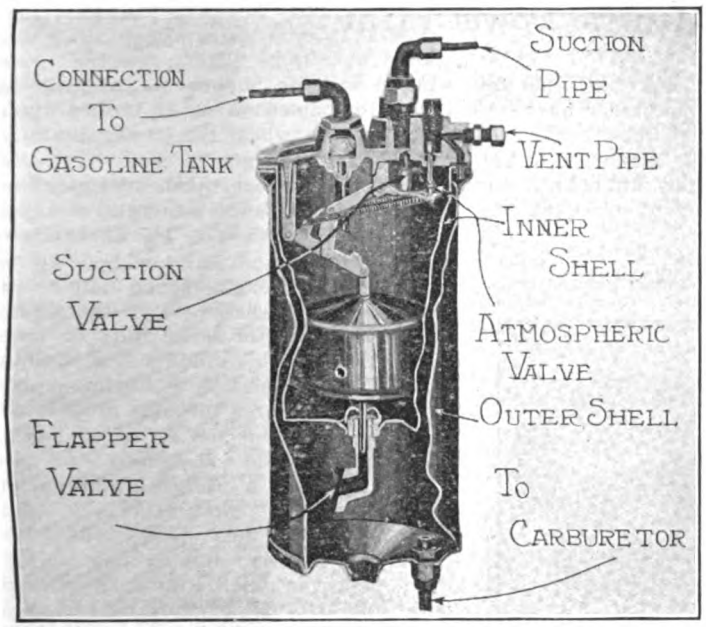


The Main Features of the Pressure Feed System.

tion valve, at the same time opening the atmospheric valve. The gasoline which has been drawn into the inner shell now flows down into the outer shell through the flapper valve, and from there to the carburetor as fast as needed. When the inner tank is empty and the float down, the position of the valves is reversed, the fuel again following into the inner tank.

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The action of the tank is entirely automatic. If at any time it should be filled to a point that causes the suction line to draw gasoline into the intake manifold, the trouble is most likely due to a leaky float. In that case the float will become



Components of Vacuum Tank of the Vacuum Feed System.

filled with the liquid and be too heavy to act, the result being that the suction valve is constantly open. The float should just be of sufficient weight to draw the operating lever, to which the springs are attached, past the center point. If not, stretching the springs slightly when they are too tight, or cutting a small piece from the end when they are too loose, will remedy the difficulty.

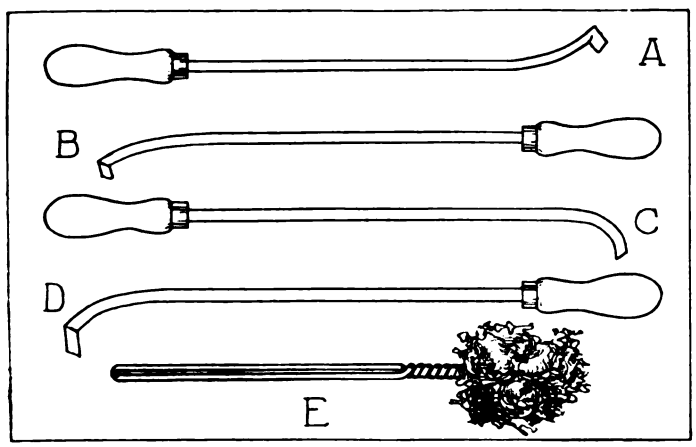
Suggestions for Proper Care.

To fill the tank, should it ever become entirely empty, close the throttle and allow the engine to turn over a few times with the electric starter. If in those circumstances it is impossible to fill it, prime with a pint or so of gasoline through the filler plug on top. The advantages of this system are that it combines the gravity and pressure feeds, allows more carrying space by placing the tank at the rear of the car, and affords a positive feed to the carburetor regardless of the level of the car.

CYLINDER CARBON SCRAPERS.

It is doubtful if one could develop sufficient pressure with a hand pump to expel the loose carbon from the cylinders. It is not absolutely necessary that air be used to force the carbon from the engine, this method being suggested because it is the simplest where facilities will permit its use. A satisfactory method is to fasten a piece of dry waste to the end of a wire and then rub it around the cylinder several times. The loose carbon has a tendency to adhere to the waste. By repeating this operation three or four times most of the carbon will be removed. The remainder will be forced out with the exhaust gases when the engine is running.

In the accompanying illustration are shown four different types of carbon scrapers. These can be purchased at any accessory store or if you are handy with the hammer you will be able to make them yourself. They consist of pieces of ¼-inch steel, flattened and ground at the end and then bent to the desired shape. The scraping end should be hardened.

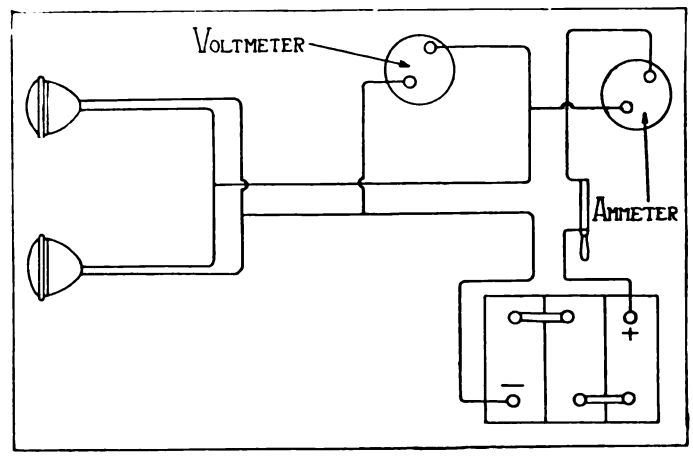


A, B, C, D, Different Forms of Scrapers for Removing Carbon from Cylinders; E, Dry Waste Secured to the End of a Wire Will Assist in Removing Loose Carbon.

AMMETER AND VOLTMETER.

The ammeter is used for determining the condition of a dry cell by short circuiting it across the terminals for an instant. The internal resistance of dry cells is comparatively high and the chemical action comparatively slow. In the storage battery the conditions are the reverse, the chemical action is very rapid and the internal resistance very low when its elements are connected. Rapid chemical action is productive of heat. It should be borne in mind that in charging a storage battery there is a difference in potential between the negative and positive plates and if the plates were joined together the difference in potential would instantly become equalized. It is this process of equalizing that gives off the current and makes the battery useful. Thus it is desirable that the cells be discharged slowly.

An ammeter is of such low resistance that connecting it across the terminals of a storage battery would produce practically the same condition as directly connecting the plates



Wiring Diagram Incorporating a Voltmeter and Ammeter in the Lighting Circuit.

together. For this reason a voltmeter is used because it has high resistance.

Regarding the ammeters used in lighting circuits, you will note that the maximum reading of the scale is from 15 to 20, and that provision is made for registering the rate of charge and discharge. These instruments do not indicate the capacity of the storage battery, but instead register the amount of current being charged into or drawn from the cells. In the accompanying illustration is shown an ammeter and voltmeter incorporated in the lighting circuit. The voltmeter indicates the strength of the current, while the ammeter shows the amount being drawn for heating the lamp filaments. This amount is small in comparison with that capable of being supplied by the battery.

To fill holes in castings, etc., use a metal that expands instead of contracts upon cooling. One such metal may be made of nine parts lead, two parts antimony and one part bismuth.

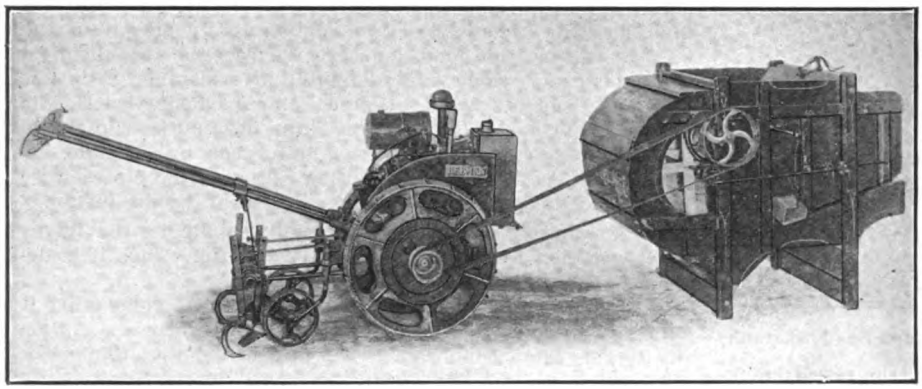
To remove rust quickly from iron parts wash in a solution made of one part nitric acid, one part muriatic acid and 12 parts water. After washing in this the parts should be thoroughly washed and rinsed in clean water.

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BEEMAN LIGHT GARDEN TRACTOR

A Type Designed for Cultivating Small Areas and Serve as a General Power Plant

TRACTOR design is based primarily on the knowledge of the constructor or inventor of agricultural work. Its efficiency depends upon his ingenuity to adapt it to uses where power will conserve manual labor. The first farm tractors were built with the purpose of obtaining large power production for plowing, harrowing, mowing and threshing. Experience demonstrated that while these economized time and men while operated, they were costly investments and could be used but a comparatively small part of the year. With the knowledge gained from actual service tractors as a whole have been greatly reduced in size and weight. There are machines designed for use of great farms that will draw gangs of 28 plows and make a series of furrows 20 feet wide at a single draft, that will plow at the rate of four miles an hour and 80 acres in a 10-hour day; that will draw teams of implements and do work with extreme rapidity. But these cannot be used on small farms.

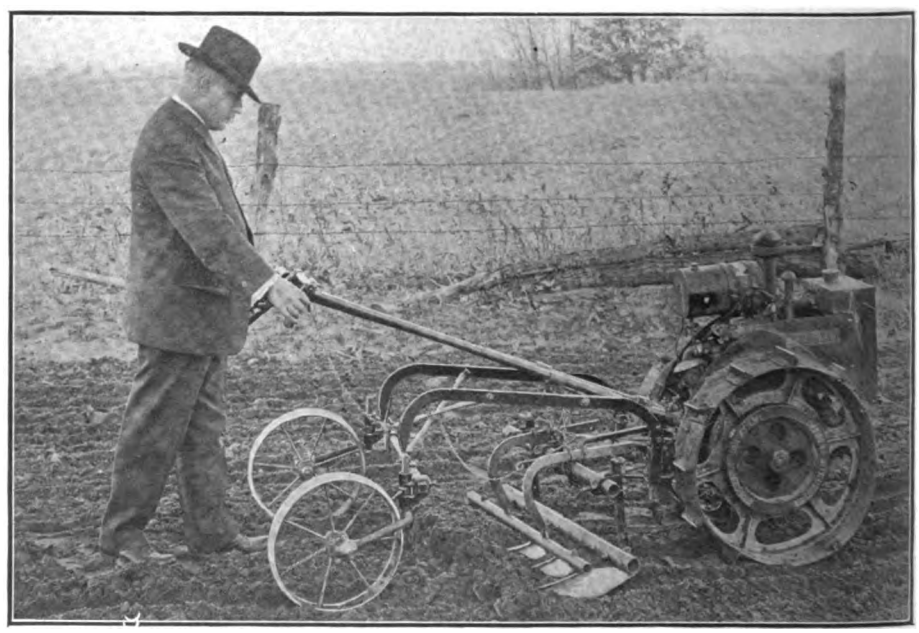


Beeman Garden Tractor with Small Wheels Attached, Coupled to a Large Churn.

Those who have studied the requirements of farmers carefully have recommended small machines from the fact that the majority of farms are not large enough to justify the owners investing in extremely expensive machinery. What is wanted is practical economy, which is best obtained with tractors that can be utilized for the greatest diversity of work. There are those who believe that the smaller the tractor the greater will be its utility, and the more it will be demanded by those who want the largest measure of economy. Because of the wide range of requirements and the construction of units to meet these the farm tractor industry is large, sound and well balanced so far as supplying the needs of the country are concerned. There are big tractors for big farms, many types of medium size for smaller farms, and most of them reliable, dependable machines.

But the Beeman garden tractor is a type produced exclusively by the Beeman Garden Tractor Co., Minneapolis, Minn., designed to economize manual labor rather than animal, and adaptable to many works that are necessary on even a small property where food crops are produced. No claim is made for it being useful on large farms, although it no doubt could be utilized to excellent advantage.

As will be noted from the accompanying illustrations the Beeman garden tractor is guided by an operator who walks behind it. The machine draws the implements and because of the design is especially suited for work where crops are grown in rows. This applies to the cultivation of onions, sugar beets, tobacco, corn, turnip, radish, parsley, parsnip, sage, lettuce, cabbage, asparagus, beans, peas, carrots, potatoes and the like, for it can be driven astride narrow rows and between wider rows, and it is so constructed that it will work in rows of practically any width.



Beeman Garden Tractor with a Cultivating Implement Attached—It Will Draw a Seven-Inch Plow or Similar Farm Tools.

The tractor is a two-wheel type when worked with an implement, there being two wide rimmed wheels 25 inches diameter, between which the power plant is mounted. The engine is a vertical, single-cylinder, four-cycle, L head type, having 3½-inch bore and 4½-inch stroke that is guaranteed to develop 1½ horsepower at the drawbar and four horsepower for belt work. The engine speed can be varied from 230 to 2000 revolutions a minute, and the tractor speed may be from three-quarters mile to four miles an hour. The engine is cooled by a thermo-syphon circulation of water through a Shotwell honeycomb radiator and a fan, and is lubricated by splash. The source of ignition current is a Heinze high-tension magneto, and the carburetor is a Kingston automatic float feed type. The clutch is a very simple construction, there being an idler transmission gear with an external or internal friction clutch disc. The final drive is by bull pinions meshing with bull gears on the wheels. The clutch is operated by a latch on the left handle and the speed and power of the tractor is controlled by the throttle on the right handle.

The tractor is 17¼ inches wide, 36 inches height and weighs about 500 pounds. The tractor control is located on a frame consisting of two long tubes extending upward diagonally from the main frame, with a crossbar on which are the lathe and the throttle. This frame is adjustable for height, to serve the convenience of the operator. The tractor has 10 inches clearance between the wheels. When an implement is attached a pair of small wheels that serve to keep the machine upright when driven free

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are detached. In one of the illustrations the machine is shown with the wheels in place.

The tractor is so constructed that any of the standard makes of hand, wheel or horse tools can be coupled to it, such as plows, harrows, drills, cultivator teeth and similar equipment. The work of changing implements can be quickly and easily done. With this machine one seven-inch plow is recommended. The gasoline consumption is small, claim being made that one gallon will serve for five hours field work and seven hours belt work.

Statement is made that the belt power is sufficient to do any small work, such as might be required in a barn, granary, wood shed, creamery, or where machines may be operated, and that fanning mills, grindstones, emery wheels, washing machines, wood saws, corn graders, pea and bean threshers, milking machines, churns, water pumps or other tools can be driven. The tractor can be taken anywhere by its own power and when not worked on the field it becomes a portable engine that can be adapted practically and economically. It is really a power plant that is always available and can be utilized without shifting for any purpose up to the limit of its power. One belt will suffice for nearly every use.

The Beeman tractor represents the development work of four years, not of unknown or inexperienced inventors or manufacturers, but of men who have worked under the direction of E. R. Beeman, formerly vice president and manager of the Monitor Drill branch of the Moline Plow Co. He was assisted by skilled and experienced tractor men in the experimental work and manufacturing, both in the shops and the field. Statement is made that the tractor as produced for commercial distribution is mechanically correct, the engineering principles have been proven, and the machines are built of high grade material. It has been a demonstrated success in all kinds of soil, and the claims made for it are based upon actual knowledge of possibilities. Beeman garden tractors are now distributed through farm implement and other dealers in all parts of the country.

ADRIAN-TOLEDO RURAL EXPRESS SERVICE BEGUN.

The Chamber of Commerce of Adrian, Mich., has promoted a motor truck rural express service between that city and Toledo, O., which is now operating, making a round trip between the two cities three days of the week, leaving Adrian Mondays, Wednesdays and Fridays at 7:30 and return from Toledo at 1:30 the same day. The expectation is that the service will be operated daily within a comparatively short time.

Announcement is made that farm mortgage loans that exceed $100,000 in amount must be passed upon by the Capital Issues Committee at Washington, but loans less than the amount stated are left to the jurisdiction of the district committes of the board.

Acremeter Records Tractor Work

CONDITIONS that were never before experienced have resulted from the activities of state and other organizations seeking to stimulate the production of large crops, especially since most of the states and municipalities, and perhaps private individuals, have purchased tractors and undertaken plowing, harrowing, cultivating and other agricultural operations for those who could not work their land to even normal productivity without assistance.

For instance, most of the states have bought tractors and plows and other necessary implements and have made contracts to plow and do other work, the prices charged being the estimated cost an acre, without profit. Owners of tractors have made contracts to do work for farmers practically on the same basis. These prices have varied, but may be said to range from $3.50 to $6 an acre for plowing, and from $1.50 to $3 an acre for harrowing, with other work on similar basis.

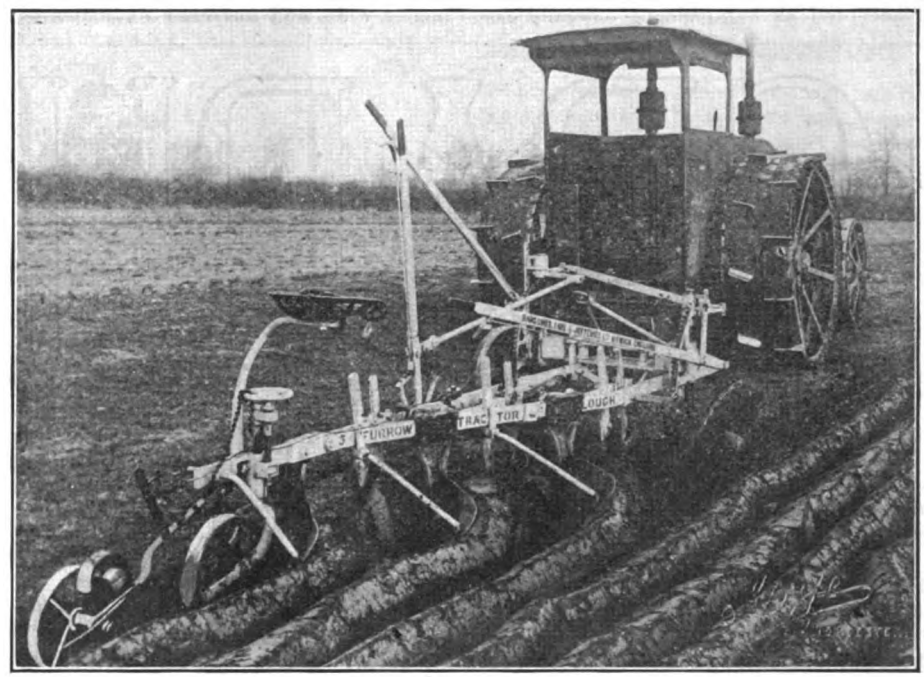
Very rarely is the area of a field known exactly, and even then there is no way of determining the value of work done save by measuring, which requires time and adds to the cost. If farm land were surveyed and plotted so that when a work was completed a few simple measurements would afford all the information for fixing the price, the condition would be exceedingly simplified.

Experience has shown that time required, at a definite price an hour for the work of tractors, the prices based on the actual operating cost plus a reaonable allowance for profit, would be the most equitable, because of the fact that there will be lost time that is not considered in a charge on an acreage basis. But the price an acre has been very generally accepted and this will probably be preferred until established facts prove that this is not as reasonable or as equitable as the time basis.

Government Found Need of Record.

In England the government has purchased large numbers of tractors and has made contract to do work on the basis of acres. In that country, even more than in America, the need has been cultivation of land, with regard to area or other condition that might ordinarily be considered, and expense has been secondary. But, nevertheless, there is no reason for disregarding prices charged or paid for work. In many instances fields are small and because of varying conditions, roughness, stones, banks, marsh and bogs and other obstacles, the entire areas could not be worked with the tractors, or, for that matter, with animals.

When the work had been completed the charges were often disputed by owners, who believed that they were overcharged, and there were numerous controversies that were simply the result of the uncertain knowledge of the areas that had been and had not been worked. In England, as in this country, the basis of work has been generally acreage, and the only manner of satisfactory adjustment was to measure the land after plowing, for instance, and this was found to add considerable to the expense. Because the agricultural operations in England are under the direction of a single body the uncertain and unsatisfactory acreage basis quickly received attention, because of its real importance. There was every reason for the farmers being satisfied that they were receiving governmental encouragement and assistance, and the government at the other hand did not want to do work at a distinct loss, for whatever was undertaken was without expectation of profit.



Acremeter Shown Attached Behind the Gang Plow, an English Instrument, Designed to Record the Work Done by Either Tractor Animal Drawn Implements.

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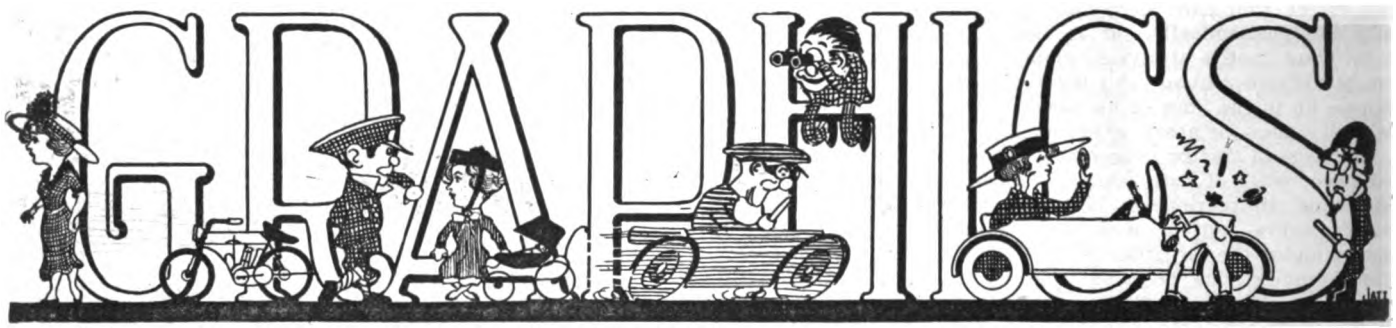
In America, because each state department is operating independently of the other, and the conditions differ materially, there has not been the same degree of dissatisfaction obtaining that was experienced in America. But without exception the officials have found the only satisfactory manner of determining prices for work has been to measure the work done in each field, often measuring each furrow.

Acremeter Developed in England.

An English inventor has developed and perfected an instrument known as an acremeter, which in general results obtained affords very reasonable data, which can be attached to any implement that is drawn, either by animals or power. It somewhat resembles a speedometer in its manner of indicating, being a train of gears and star wheels operated by a drawn wheel. It is a very practical instrument and has been found by experience to be reasonably accurate. There is no doubt that it saves time and if accepted as a means of officially recording work it is fair to all interested.

The acremeter is fitted with two star wheels for plowing, the one being in use and the other idle, representing two, three, four or six furrows. By removing a nut and taking off the outer star wheel and changing it for the inner, alternation is obtained for multiple furrow registration. The instrument is fitted with two trips, one of which is used to register for two and three furrows and two trips for three and six furrows. The meter is bolted to the plow and is connected to the lifting mechanism on the beam of the plow. When the plow is lifted off the ground the instrument is stopped. The meter, like a speedometer register, is read in tenths of acres, and it can be fitted to corn drills, binders, mowing machines, or, in fact, to any implement that is drawn on the ground, and being connected to the lifting gear it is in every way adjustable. As stated, it will register for a width of six feet by a up to six furrows, either nine or 10 inches wide, and for other implements it wil register for a width of six feet by a simple change that can be made in five minutes' time. As the acremeter only registers when in contact with the ground, it is maintained to be entirely automatic and entirely dependable. It can be fitted to any type of plow.

In use, a reading of the indicating dial is made before work is done, the owner of the land or his representative signing a ticket on which the reading is written. After the work is completed another reading is made and similarly recorded. As the record is in duplicate a copy is given the farmer and the other retained by the tractor driver. From these the price is established and the charge made. Incidentally the acremeter can be used for animal work. The cost of the instrument is said to be moderate and the service life is very long. An accompanying illustration shows the instrument attached to the rear of a plow drawn by a tractor. There is no doubt that such a registering device would be found equally serviceable in this country.



That speeding is not a fault to which the Americans alone are addicted, is shown by an item recently appearing in an English journal, which also would indicate that even the British policeman is prone to err in this matter at times.

"When the deputy chief constacle of Taunton was driving from Glastonbury a food production car got in the way," the item states, "and, it was alleged, was driveh in a zig-zag course for 4½ miles to prevent the car behind from overtaking it. The defense was that the driver of the obstructing car did not like being passed on a narrow road, and that the speed was 25 miles per hour. Entering the main road he slowed down and the



police car rushed past him like a flash, probably greatly exceeding the former's speed, which landed him in the police court and a fine of $5 and costs."

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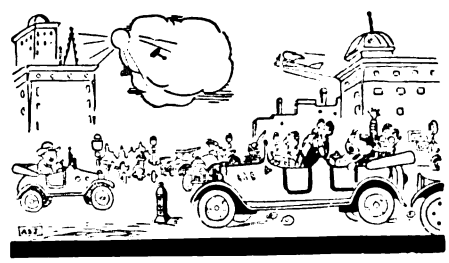
The charge that the English idea of humor is prosaic is well known and it is not difficult to pick from the English journals plenty of samples for substantiation. The following item, however, of that the British punster is not opposed to recent publication would also indicate



springing chestnuts:

"According to a trade journal there are now very few expensive motor cars for sale, and pedestrians must for the present content themselves with being knocked down by taxicabs and other small fry."

This subtle and brilliant bit of humor appeared in no less publication than the famous humorous journal, Punch, of London. The same idea was incorporated in hundreds of jokes appearing in American papers some 12 or 15 years ago.



The first Sunday after the Fuel Administrator had lifted the ban on Sabbath motoring the streets in the large cities were the centers of heavy traffic, giving the impression of a holiday or some gala occasion in contrast with the quiet and inactivity that had been so noticeable during the days on which motoring had been tabooed.

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The gasoline-less Sunday order didn't worry Glenn L. Martin, the aviator and head of the Glenn L. Martin Co. of Cleveland. Mr. Martin, remembering some of the devices used in Europe to save gasoline in the running of motor cars, had the Goodyear Tire and Rubber Co. make up for him a huge gas bag, which he installed on the top of his brougham.



This he filled with regular fuel gas and then ran his machine about the streets of Cleveland and elsewhere quite unconcernedly, serene in the knowledge that he was not violating the government's gasoline order and happy in the further belief that he was making a suggestion that might well be followed by car owners generally for the conservation of gasoline.

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Aside from the work accomplished by the motor car in its normal capacity in the last Liberty Loan drive, it was most effective in helping to make the loan successful as the basis for tank floats, which were used in a number of cities. Various dealers who participated in the drive had replicas of the British tanks made of light material, which were placed over their motor cars and driven about the cities with appropriate slogans and other announcements painted on the sides, created a strong patriotic sentiment. The tanks were not makeshift imitations, but in outward appearance closely resembled the ponderous machines that gave the



Germans the surprise of their lives at the battle of Cambrai.

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During the gas-less Sunday period many novel means were employed by motorists to keep their cars going while observing the Fuel Administration's request that no gasoline be used. Many used kerosene, some alcohol, while others employed illuminating gas. One man in New York, however, resorted to



the original horse power, hiring a pair of horses, which he hitched onto the front of the car. This expedient was probably adopted mainly for the purpose of seeking notoriety and it certainly attained this end, as the car was the object of a cheering crowd everywhere it went. One man held the reins while another did the steering and operated the brake.

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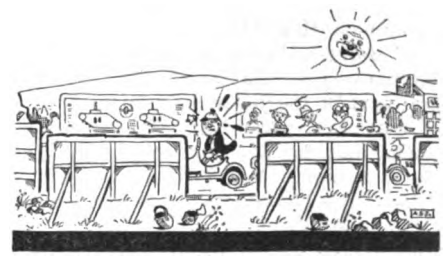
Motorists of Junction City, Kan., who travel on a long, level road some miles



outside of the town having been testing out their speed recently in competition with a huge jack rabbit, which at times, according to these veracious speedsters, attains a pace of better than 40 miles an hour, or what is known as a "flivver jog" out West. Motorists who have enjoyed the experience of racing with Br'er Rabbit, state that he jumps from the same spot on the road each evening and after racing for several blocks ahead of the machine, jumps back into the brush.

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The Pennsylvania Highway Commissioner has recommended a sign board tax



for his state as a means of stopping the rapid eclipse of the scenery as a result of the erection of such a large number of long and high sign boards along the roads leading from Philadelphia to Pittsburgh. It is stated that in some sections the sign boards are so thick that the tourist passes along his way between veritable walls of advertiements.

WAR TAX DECISIONS ON POWER VEHICLES.

The following statements are the official construction of the war taxes as applied to power vehicles and equipment, as established by Deputy Commissioner B. C. Keith of the Treasury Department, Washington, at the request of the National Automobile Dealers' Association.

That automobile bodies, side cars for motorcycles, speedometers and other attachments and accessories to automobiles and motorcycles, are not taxable when sold separately, but they are when sold as part of an automobile or motorcycle or its equipment, whether standard or not.

That where any person other than a manufacturer of the chassis completes and sells an automobile, the tax must be paid on the complete car, less any tax already paid on the sale of the chassis.

That where a dealer, in order to reimburse himself for the tax paid by him to the manufacturer of a chassis, adds the exact amount of the tax to his invoice as a separate item, stating it to be the war tax, such amount may be excluded in determining the price for which the article is sold. But where the price of an article is increased to cover the war tax, the tax is upon the increased price. Or, if the dealer adds any different amount than the actual tax paid, no matter in what way or with what explanation, the tax must be calculated upon the dealer's total bill.

With regard to the inclusion of freight charges in the price upon which the tax is to be computed, that where the freight charges to a point of delivery are paid by the dealer, such freight charges, if billed as a separate item to cover freight, need not be included in the amount upon which the tax is to be computed. However, as in the case of reimbursement of tax paid, if the price of the article is increased to cover freight charges, the tax is upon the increased price.

Where a dealer purchases a truck from the manufacturer for $1000, adds a body costing $400, and sells the complete car for $1900, plus $70 freight charges, plus $30 war tax, or $2000 in all, the tax is three per cent. of $2000, or $60, less the $30 already paid to the manufacturer upon the sale of the truck, making $30 tax. On the other hand, if the $70 freight charges and the $30 war tax are billed as separate items, they need not be included in the amount upon which the tax is to be computed. The tax would then be three per cent. of $1900, or $57, less $30 tax already paid on the original truck, making $27 tax due upon the sale by the dealer of the completed machine.

BOARD OF COMMERCE APPROVES TRUCK TRANSPORT.

The Board of Commerce of Bay City, Mich., has undertaken to promote highway transportation between that city and other cities in a very practical way. There is no doubt that with the substantial promotion afforded the services will be developed substantially. Public services are now operated between Bay City and Saginaw, Flint, Holly, Pontiac, Owosso, Lansing, Battle Creek, Midland, Alma and places between these terminals, and freight is delivered in one day from Bay City to Flint and from Bay City to Detroit in 24 hours. The saving of time has been a marked advantage to business men.

SELDEN COMPANY ELECTS OFFICERS.

At the annual meeting of the stockholders of the Selden Truck Sales Co., held at the general offices of the company at Rochester, N. Y., the following directors were elected: George C. Gordon, William C. Barry, R. H. Salmons, Hal T. Boulden, W. F. Reynolds, E. B. Osborn, F. J. Kolb, H. G. Strong and C. H. Stearns. The reports submitted showed that the company has had a very prosperous year's business and that it has established representation in all principal commercial centers in this country and abroad.

NOVEL LIFE NET CARRIER FOR FIRE DEPARTMENT TRUCK.

The San Francisco fire department has motorized all hook-and-ladder apparatus and in doing so has equipped the trucks that carry the life nets with a specially constructed box which is upported under the body of the truck.

In this box the life net is carried flat and is so arranged that it can be removed from the carrying box very quickly. The box is fastened directly under the platform on which the firemen stand. The placing of the life net out of the way in this manner gives the truck a neater appearance, and gives more room for the firemen on the platform.

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Know the Cost of Doing Business

In This Article Dealers Will Find Some Pertinent and Practical Suggestions Covering Overhead, Mark-Up and How to Gauge a Consistent Profit

By Walter Engard.

There is no subject of more importance to the successful management of any business than that of "knowing the cost of doing business and how to correctly figure the "mark-up." The failure on the part of the business man to know to a certainty what his cost of doing business may be and how to figure his mark-up correctly has driven more dealers into the bankruptcy courts than any other one thing.

These two fundamentals are the basic principles upon which all really successful businesses are built. The dealer may have all the other fundamentals of success—good service, good merchandise, courteous employees, etc.—but if he does not know what his costs of doing business may be or if he erred in his method of figuring profits, his chances for making money are very slim. In this day of advancing costs and decreasing profits it behooves the dealer to know, not merely guess at these fundamentals. Because the mark-up can be figured correctly, it is absolutely necessary to know just what the costs of doing business are so that the per cent. of mark-up will be sufficient to cover and leave a fair margin of profit.

Determining Accurate Costs.

In order to determine accurate costs it is necessary to keep an accurate record of all money spent for expense. To find the cost of doing business in per cent., take the total gross sales for the year and divide them into the total cost of doing business (expense); this gives per cent. of expense. For illustration, say the total gross sales for the year are $50,000 and total expense is $9573.50. In order to know just what per cent. of all money received is for expense, divide $9573.50 by $50,000. The answer will be 19.14 per cent. The rate so obtained is only as accurate as the figures which produced it. If every item of expense in the $9573.50 has not been included the per cent. of profit as found will not be accurate. All expenses will come out of the gross profit whether they have been charged in it or not. What the expense book doesn't show the bank balance will.

The cost of doing business, of course, is exactly the same whether all items of expense have been charged in or only part of them. If all items of expense are not included, however, the dealer may be led to believe that he can fix a lower selling price than he can afford. He does not realize that his margin of profit will be immediately absorbed by the extra expense which he has failed to charge to his cost of doing business. This extra cost may not show on his books, but it is there just the same, and will come out of the profits before the end of the year. For example, say that in figuring the per cent. of doing business failure is made to charge into the expense account items which amounted to $500, and instead of the expense being $9573.50, as charged on the expense account, they were $10,073.50. Because of the failure to charge this extra $500 costs were computed on the figures shown by the expense account and it proved to be 19.14 per cent. For example, say that a net profit of 5.4 per cent. is desired and the goods are marked for a gross profit of 25 per cent. The gross profit on $50,000 business would be $12,500, deducting the expense of doing business there should be a net profit of $2926.50. But instead of a net profit of $2926.50 there is only $2426.50, a difference of $500, or only a net profit of 4.8 per cent. This is a very simple example.

In the case of one retail dealer who figured a gross profit of 20 per cent. and his cost of doing business at 10 per cent. (he was not in the business of selling supplies or running a garage or repair shop, however). From all of his records 10 per cent. of his total sales would cover his cost of doing business, as shown by his expense account, but when the end of the year came, instead of a net profit of 10 per cent., as his books showed he should have, his net profit was only 3.5 per cent., a difference of 6.5 per cent., or more than $5000. For his sales amounted to close to the $100,000 mark. The following year he resolved to know just what was the matter. He kept a strict account of all items of expense. He discovered that he had not charged into his cost of doing business his wrapping expense (this item alone amounted to a considerable sum in a year), nor had he charged losses and depreciation to expense, as well as several other items which amounted to considerable money in a year's time.

But this was not the only thing that the keeping of an accurate account of all costs did for this dealer; it helped him to keep a closer tab on expenses. When his cost of doing business was being figured at 10 per cent. he thought they were low and gave them very little thought or study. But when his records showed him that they were 16.5 per cent. he began to give them his serious consideration. He installed a new system of management; he kept his eye on the expense account and today with every item of expense charged in, he is doing business on a cost of less than 10 per cent.

Items Entering Into the Costs.

What items enter into the cost of doing business? A list of items that enter into the cost of doing business and that should be charged to expense, follows:

1. Interest on the net amount of total investment; that is, money invested in the stock and fixtures.

2. Rental on all real estate or buildings owned by proprietor and used in his business at an equal rate to that which would be received if rented or leased to others. If quarters are rented charge all rentals to expense.

3. Salaries. This expense will include all salaries paid to employees, also a salary for proprietor equal to that which he would command if in the employ of another and holding the same position. All members of the proprietor's family who may be employed in his business should also be treated in a like manner.

4. Depreciation on all goods which are carried over and upon which a markdown has to be made because of change in style, damage or for any other reason.

Building Profits

If you sell supplies there are overhead costs.
If you do repairing there are overhead costs.
If you store and care for cars there are overhead costs.
If you do vulcanizing there are overhead costs.
If you do welding there are overhead costs.
If you rent cars there are overhead costs.
If you rent trucks there are overhead costs.
If you sell cars there are overhead costs.
Whatever you do there is some cost attached to it. To make money you must know that cost and to operate at a profit you must know what percentage of profit you can add to your costs to make a consistant revenue.
You can base your actual operating costs on the past year's business and add to that cost what you really know it will cost to operate the coming year and allow an increase that you know you will have to meet.

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This will also include concessions in price to patrons given special quotations on a large purchase. The depreciation here will be the difference between the regular retail price and the amount received.

5. Depreciation on fixtures, tools, delivery equipment or anything else suffering from age or wear and tear.

6. Donations and subscriptions given to church, lodges, etc.

7. All fixed expenses such as taxes, insurance, water, light, fuel, etc.

8. Incidental expenses, such as drayage, postage, office supplies, livery or expenses of horse and wagon, telephones, telegrams, advertising, canvassing, etc.

9. Collection expense.

10. Losses, goods stolen, bad accoutns, etc.

The above list covers most every item in the operation of an average business, but in order to keep an accurate account of all expenses an expense book should be kept. This book should be subdivided into 12 separate divisions. These headings should be: Rent, salaries, advertising, drayage, delivery, heat and light, supplies, insurance and taxes, wrapping expense, depreciation and shrinkage, bad debts and miscellaneous expense.

Under each heading will be charged every item of expense pertaining to that department, as for instance all forms of publicity will be entered under the heading "advertising," including donations and subscriptions, bill boards, newspaper space, dodgers, etc. Under the heading of "wrapping expense" will be entered such items as boxes, paper, twine, sacks, labels, etc. Under the "miscellaneous" expense all items included in the other divisions, such as soap for cleaning windows, toilet paper, etc., will be recorded. This expense will include hundreds of small items which usually are overlooked in figuring costs.

Here is included every expense itemized and it can be seen at a glance just how the expenses are running. The dealer will also have a better control over his expenses. At a moment's notice the advertising expense can be totaled and whether it is too large or whether more can be spent can be determined. By this system the dealer will know just where he stands; just where he should economize and where he should make investigations to stop losses.

With the exact cost of doing business the dealer is in a position to correctly figure his mark-up, providing he uses the right method. It is unfortunate, but nevertheless true, that there are a great many dealers doing business today on very little or no profit. Some are doing a large volume of business, yet at the end of the year, after long hours and strenuous work, they make the unhappy discovery that they have accomplished very little in the way of profits. They have nothing to show for their work and worry. This conditions is due very largely to their failure to correctly figure the mark-up. It is fundamentally important that every dealer should know exactly how to mark up his goods in order to obtain a profit. Moreover, he should know why the method he uses is right. If he uses a mark-up formula he should know why that formula works.

Methods of Figuring "Mark-Up."

There are two methods of figuring mark-up. The first bases the percentage on the sales; the second bases it upon the cost. Either method is correct. But disaster comes when the dealer mixes the two and fails to realize what he is doing. The first method, based on the total sales, is the simplest, the most satisfactory and by far the easiest and most accurate. In this the selling price equals 100 per cent., or 100 parts. Of this total the cost of the merchandise equals so many parts, the cost of doing business so many parts and the net profit is represented by the number of parts remaining. The sum of all the parts equal 100, no matter how they may be divided.

To illustrate, take an article that costs $4.50 and find the selling price. Say the cost of doing business is 15 per cent. and a net profit of 10 per cent. is desired. One hundred per cent. or 100 parts equals the selling price; 100 per cent. minus 15 per cent., the cost of doing business, and 10 per cent., the net profit, is 75 per cent., which equals the cost. Therefore, 75 per cent. equals $4.50.

75 per cent. equals $4.50.

1 per cent. equals 1/75 of $4.50, which is six cents.

100 per cent. equals 100 times six cents, which is $6, the selling price.

Of the selling price ($6) 15 per cent. goes for the cost of doing business, which is 90 cents; 10 per cent. is net profit, or 60 cents. The remainder, $4.50, represents cost of merchandise.

Simplicity of Method Shown.

This is a very simple method. It is perfectly clear that if the number of parts in any of three divisions be changed the change will affect one or both of the other parts, since the total must always equal 100 parts. Suppose for example, that the cost of the article ils 85 per cent. intead of 75 per cent. If the cost of doing business remains the same, nothing is left for net profit. Again suppose the cost of the article remains as originally at 75 per cent., but the cost of doing business is reduced to 10 per cent., then the net profit increases to 15 per cent. A change in any one of the parts, in other words, is bound to affect one or both of the other parts.

The second method of figuring mark-up is based on the cost. In this, 10 per cent. or 100 parts represents the cost, instead of the selling price, as in method No. 1. The cost of merchandise will always be 100 parts, but the cost of doing business and and net profit may be any figure. In using this method of figuring mark-up the cost of doing business must be based on the cost of merchandise; also the net profit. Probably more errors are made at this point than anywhere else. The error usually comes from the fact that as a rule the average merchant figures his cost of doing business and the net profit as a percentage of sales. Then when figuring mark-up they take their cost of doing business per cent. as based on

Must Know Costs

If you know what it cost to do business you can then build your business to the profit making point. You never can until you know. If you do show a profit without such knowledge it is all luck and when the pinch comes you will be all at sea. Furthermore, if you do know and are making a profit you can add to it.

Stop the leaks, such losses are the easiest profit earned. Do not make one department earn the dividends and carry the others. Get your overhead costs in all departments. If you are losing in any one department learn the operating costs before increasing the prices for either goods or labor. It may be in the waste through lack of common sense system.

If you do work or sell goods at a loss let the other chap have the business. It may be in his particular line and in it he can make a profit. Take on the work that will show a profit or sell the lines that you can place and show a gain. This will not hurt your business or help the other chap. If you make money you can give the service and if you do you will secure the patronage and profit.

Adopt A System

Keep working yourself these times and build up every branch of your business so that it will be turning in a profit. If you cannot make money in one way the door is wide open; take on other lines that will sell and show a net gain. There is money spent and as long as there are 5,400,000 passenger cars and 300,000 trucks in use there must be business for you.

If your accounting methods are not comprehensive, correct this weakness in your business. You can swing a simple system; any good bookkeeper can fix you out and start you off with one that will just fit in with your requirements. You can do the rest. Don't guess any longer. Start to know at once. Facts may vary, but figures seldom do and until you have the records you can never get your figures.

This article is a whole business lesson in itself. If you do not believe it just ask yourself a few questions and then see how you fit in with your own busines. If you know the facts, discuss it, it will refresh your memory and make you even more particular about overhead costs and profits.

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sales, add to it the per cent. of net profit as based on sales and completely forget that these figures are not based on the cost of merchandise as they should be. Therefore, the mark-up percentage is too small, for the sum figured as a percentage of the total sales always is smaller than the same sum figured as a percentage of the total cost of merchandise.

To prove this, suppose the sales for a certain store are $50,000. The cost of doing business is $9500 and the cost of merchandise is $38,000. The remainder, $2500, is the net profit. The cost of doing business, figured as a percentage of sales, will be as follows:

$50,000	$9,500.00	.19	(19 per cent.)
	5,000.00		
	4,500.00		
	4,500.00		

The net profit figured on the sales will be:

$50,000	$2,500.00	.05	(5 per cent.)
	2,500.00		

Now basing the same figures on the cost of the merchandise, we find they are as follows:

$38,000	$9,500.00	.25	(25 per cent.)
	7,600.00		

The net profit:

$38,000	$2,500.00	.066	(6.6 per cent.)
	2,280.00		
	220.00		
	228.00		

Here we find a difference of six per cent. between the cost of doing business figured as a percentage on the sales and as a percentage of the cost of merchandise; and in the net profit there is a difference of 1.6 per cent. Suppose a dealer takes the wrong figures as the basis of his mark-up. Say an article costing $4, and in the effort to find his retail price he uses the percentage as based on the sales. He would figure:

19 per cent. plus 5 per cent. is 24 per cent. (the cost of doing business plus the net profit as based on the sales.)

$4 times 24 per cent. is .96 cents (gross profit).

$4 plus 96 cents is $4.96 (his selling price).

Would a profit be made at this figure? By using the correct figures the result would be:

$4 times 25 per cent. (his real cost of doing business) is $1.

$4 plus $1 equals $5 (a selling price, figured on a correct cost of doing business, but without taking any net profit.)

It will be plainly seen that the dealer who erroneously marked his goods to sell at $4.96 would be paying four cents for the privilege of handing them over the counter to his customers. But if this dealer figures his mark-up so it will bring him a profit he will proceed as follows:

25 per cent. plus 6.6 per cent. equals 31.6 per cent. (gross prfiot).

$4 times 31.6 per cent. equals $1.26.

$4 plus $1.26 is $5.26 (his correct selling price).

The above illustration will show how easily it is to become confused in figuring mark-up when in reality money is being lost. So it is tremendously important that a dealer know exactly what he is doing. If he counts on too small a mark-up he will only be cheating himself and paving an easy road for loss. And if this trouble persists in all mark-ups, all opportunity to make money is lost. On the other hand, if he unwittingly figures too large a mark-up, he runs the risk of selling at a higher figure than his competitors and loses trade by so doing.

BOARD OF COMMERCE APPROVES TRUCK DEPARTMENT.

The Board of Commerce of Bay City, Mich., has undertaken to promote highway transportation between that city and other cities in a very practical way. There is no doubt that with the substantial promotion afforded the services will be developed substantially. Public services are now operated between Bay City and Saginaw, Flint, Holly, Pontiac, Owosso, Lansing, Battle Creek, Midland, Alma and places between these terminals, and freight is delivered in one day from Bay City to Flint and from Bay City to Detroit in 24 hours. The saving of time has been a marked advantage to business men.

GENERAL MOTORS CORPORATION SHOWS LARGE PROFITS.

For the six months ending June 30 the profits of the General Motors Corporation totaled $26,978,120, and after paying the Federal taxes and all extraordinary expenses a balance remained of $12,587,259. Following the payment of preferred dividends $11,717,480 remained, or approximately $11.14 a share on common stock outstanding to the value of $105,141,700.

CONTINENTAL MOTORS HAS YEAR'S ORDERS.

The Continental Motors Corporation, Detroit, has just paid to holders of common stock a dividend of 1½ per cent., this making a total of six per cent. paid on common stock during the calendar year. Secretary W. R. Angell, advising the stockholders of the dividend, stated that the business of the company was very satisfactory, and that the orders ahead insured the operation of the Detroit and Muskegon plants until late in the autumn of next year.

During the eight months ending Aug. 31 the sales of the United States Rubber Co. were greater by 34 per cent. than they were for the corresponding period of 1917. The working capital of the company is now in excess of $95,000,000, with cash assets exceeding the floating debt about $1,500,000.

FORDSON TRACTOR PULLEY ATTACHMENT.

The Fordson tractors thus far built have no belt pulley and for that reason cannot be utilized for belt work, which is regarded by many buyers almost as necessary as hauling field implements. Although 24,000 machines have thus far been built, none have this utility. Henry Ford & Son will during November produce an attachment that may be fitted to Fordson tractors, so that they may be used to supply belt power. It is built without a governor. Statement is made that owners of tractors were so insistent for such equipment that they could use their machines for power plants that the company was impelled to produce what has been developed. The tractor is claimed to afford good results with the attachment and that a governor is unnecessary. The attachment will be furnished at additional cost to all Fordson owners. All tractors delivered after the attachment is produced commercially will have it fitted as extra equipment.

FENNER BECOMES ASSISTANT TO C. C. HANCH.

David C. Fenner, with the International Motor Co., member of the Highways Transport Committee of the New York State Council of Defense, member of the motor truck committee of the National Automobile Chamber of Commerce, president of the Motor Truck Association of America, is now located in Washington as assistant to C. C. Hanch, chief of the Automotive Products Section of the War Industries Board.

LAND MANAGER.

R. J. Miller, formerly connected with the Studebaker Corporation, has been appointed district sales manager for New England for the Cleveland Tractor Co. to succeed H. S. Ketcham, who recently resigned that position. Mr. Miller's headquarters is in Boston with A. H. Sowers, who is agent for Eastern Massachusetts for Cleveland tractors.

MITCHELL & SMITH CO. CARRY BIG LINE OF GASKETS.

The Mitchell & Smith Co., Inc., 1090-92 Commonwealth Ave., Boston, Mass., are carrying a large stock of gaskets for every make of car and can fill all orders without any delay.

The Zenith Carburetor Co., Detroit, has obtained authorization for an addition to its factory that will cost approximately $75,000. Work is to be begun immediately.

To harden files dip in red hot lead, handles up, which gives a uniform heat without warping. Run the file back and forth in a pan of salt water, then set it in a vise and straighten while still warm.

To "soften" files cover with oil and hold over a fire until the oil blazes. When the flame runs all over the file plunge into water.

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(Continued from Page 14.)

dition the timer was examined, and when this was removed it was found to be so much worn that further use appeared problematical.

The segments were worn considerable below the surface of the insulation, and the roller brush would pass the segments without making firm contact. The segments were carefully removed and then a sheet of a letter was cut into strips for shims and the thicknesses were placed behind each contact piece. With these in place when the segments were screwed up the edges, while somewhat uneven, were flush with the fiber insulation.

In testing the repair the small coil spring which held the roller arm and causes the brush to make firm contact was lost. After unsuccessful search was made for it the need of a substitute was obvious, and this was made from a "safety pin," the point and the fastener being cut off and the ends bent to hook into the brush arm and the fixed bracket. With the paper shims and the "safety" pin spring holding the brush the timer was assembled and during the remainder of the journey it proved to be satisfactory from every point of view.

CARE OF THE MAGNETO.

Magnetos have been developed to such a degree that the chief requirement to maintain them in good condition is the application of a few drops of oil occasionally. But they must be kept dry and clean, as oil and dust that will accumulate in the distributor will eventually set up resistance to the passing of current and short circuiting will result. This will greatly impair efficiency of the machine.

Few of the auxiliaries used with power vehicle engines are comparable with magnetos for durability and reliability considering the attention given them. All the oil needed is one drop of very light lubricant every 500 miles in each oil hole. There are usually but three places where oil can be applied, one at each end of the armature shaft and one at the distributor. A leather boot is the best means to protect a magneto against dust and moisture. A rare occurrence is water from rain getting into the safety gap, which will stop the delivery of current. There are many types of magneto fitted with water proof coverings, but these do not always fully protect the machines against moisture.

One detail is to keep the magneto clean. This requires that the distributor head shall be removed regularly and cleaned with a cloth dipped in gasoline. The dirt and oil that will in time accumulate mean a short circuit if not removed. The cover should then be removed and the inside cleaned in the same way. While the distributor is open one has opportunity to inspect the fit and general condition of the carbon brush assembly. Black accumulations, due to wear of the carbon brushes, can be removed with a gasoline saturated cloth. See that the brushes are in good condition, that they make good contact, and should any of them stick in the holders, due to accumulated grease and dirt, a few drops of gasoline will be sufficient to clear them.

Another place needing careful inspection is the points of the circuit breaker, which will become pitted from the arcing of the current as the circuit is made and broken. There is a tendency for the current to carry minute particles from the positive to the negative point. Accumulation of dust on the points may also affect them to some extent. Sometimes the pitting of the points will be so deep and the surfaces so rough and irregular that the current will not pass. The remedy is to smooth them with a very thin, flat file or a piece of No. 00 sandpaper. The sand paper may be folded so that there will be two sanded surfaces, and when this is drawn between the points both may be cleaned at the one operation. The points may be separated by unscrewing the large platinum pointed screws or by advancing the spark lever until they close on the sandpaper, which may be moved backward and forward between them. Care should be taken to remove no more platinum than is necessary to obtain smooth surface, and both should be even and true. Sometimes merely drawing a piece of paper between them will remove the oil and dust that has obstructed the current and will restore them to efficiency. Files are made for this work, but in the hands of unskilled workers there is a possibility of more damage than good being done, and very satisfactory restoration can be made with the sandpaper and there is less probability of removing the platinum, which is very soft and easily cut away.

When this work has been done the engine should be cranked until the points are wide open. By inserting the gauge usually provided by magneto manufacturers with all machines sold, and which are part of the regular equipment received by the owner, the gap can be measured. This gauge should pass through with slight friction. A gap of .015 inch is about the correct spacing for the points, and the adjustment can be made with the wrench provided with the magneto for this work.

Another element that requires attention after long service is the collector ring. One probability is gumming, which will cause the ring to make close contact with the carbon brush that rides in the collector ring groove, and when this condition obtains the current cannot pass. To determine the condition of the ring remove the brush and with a small electric light examine the groove. If it is in good condition the ring will be bright, but wherever it is not bright that deposit should be removed by dipping a small piece of cloth in gasoline and placing it on the end of a small, round stick, which can be inserted vertically in the groove. With the engine cranked by a helper the ring may be revolved and the groove thoroughly freed of any foreign matter. While the carbon brush is out of the ring it should be examined for cracks, and one had best see that it moves freely in its guide or holder and that there is good tension on the coiled spring.

No one should undertake to make repairs to the magneto other than an expert with a complete kit of tools, and it should be shipped to the manufacturer for such repairs as for a leaky condenser, loose windings, ruptured secondary or weak magnets. Many an instance of sluggish engine action can be traced directly to a weak spark due to some electrical or mechanical derangement in the magneto itself, and for this reason, once a year at least, and better still, every six months if used for heavy truck service, the magneto should be given a complete overhaul. Present day fuel contains a very high percentage of kerosene, the engine-requires the hottest spark possible to ignite the charge, cause good combustion and obtain good efficiency. Unless the ignition system is functioning normally there will be excessive consumption of fuel, lack of power and increased operating cost, as well as a lack of flexibility so essential to power vehicle.

CARE OF ENGINE COOLING SYSTEMS.

Many instances of the reduced efficiency of gasoline engines can be traced directly to the failure of the cooling systems to keep the temperature of the radiating medium down to the degree that will insure safe operation. The man who anticipates trouble is a greater man than one who simply "doctors" after something has happened. Many high grade trucks and passenger cars are frequently damaged by the water level falling too low in the radiators, either from oversight, or leakage in the cells, or the piping, or perhaps from evaporation.

When water is low in the upper tank, especially in thermo-syphon systems, the engine cannot possibly be cooled adequately. Complete radiation is not possible from the cooling area, even though the water is pump circulated. The thermo-syphon requires a steady stream of water from the radiator inlet to the radiator outlet and back to the cylinder jacket and back to the radiator intake, and if the stream is not continuous the engine cannot be effectually cooled.

One of the peculiarities of the thermo-syphon system is that when the water level is too low steam pockets are formed, which retard the circulation and overheating results, lessening the volume of the oil films between the pistons and the cylinder walls, or even destroying them, which is followed by rapid wear of the moving parts, and possibly by seizing of the pistons. Piston seizing is a result that may happen with any system of cooling that has not a full degree of efficiency.

If leaks have been developed in the radiator these should be stopped. Some of the radiator mending compounds which are placed in the water and by chemical action or other means seal small leaks, possess considerable merits for temporary repair. But if one desires a permanent repair this can only be done by soldering, which is a work that must be done by a skilled worker.

The engine builder, after long study and at considerable expense, has provided a cooling system for no other reason than to maintain an oil film between the pistons and the cylinder walls, this insuring that the pistons will move freely and

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with the least loss of power through friction. Of course it is possible to destroy this oil film though the water system be completely filled, by running the engine for a long time with the spark retarded, or if the cylinder heads be heavily carbonized, but so long as the oil film remains there can be no damage, even if the water is boiling or nearly so.

An engine will become greatly heated with a retarded spark. The reason for this is plain when we consider that the piston has already started on the downward stroke after reaching its highest compression, and the explosion takes place a very small fraction of a second after the spark has been made in the cylinder.

When advanced the spark occurs on the upward stroke, while when retarded the spark takes place after the piston has begun the downward stroke and greater heat is produced. That overheating results is not surprising when one realizes that the highest temperature as the charge is burned in the cylinder, following the making of the spark, will range from 2500 to 3000 degrees Fahrenheit.

Two methods of cooling are used for the engines of power vehicles—air and water. By the first methods the cylinders are fitted with pins, ribs or flanges that increase the radiating surfaces, and over these there is usually a current of air driven at high velocity, the temperature being kept within safe operating limits.

By the second method the cylinders are cooled by being surrounded by baths of water, which is circulated through a radiator, through the cells of which air is driven or drawn, the radiator having a cooling area that is scientifically determined to diffuse a given number of heat units.

In both systems it is of paramount importance that the belt driving the fan be kept at a tension that will insure full efficiency, and slippage should be insured against by frequent examinations and treatments with French chalk, as well as by adjustments of the tension. In the water cooled systems the pump may become clogged after long service with rust or sediment, particularly if hard water is used. Hard water contains lime and other impurities that cause deposits and scale, which insulate the walls and prevent the diffusion of heat. Whenever possible the cooling systems should be filled with rain water that has been strained. This is the safest way of preventing deposits and scale.

The next important unit is the radiator, which frequently becomes more or less clogged with rust, or sediment, or deposits, which means retardation of the water circulation. The condition of the radiator should receive as much attention and care as any other part of the vehicle. It should be cleaned regularly so that there is certainty that it will function to full efficiency. If this care is given it will go a long way toward obviating pump trouble. If the cooling system has been neglected for a long period the best means to clean it is to remove the water header or the detachable head, and with a scraper or heavy wire loosen the scale and flush out the cooling section.

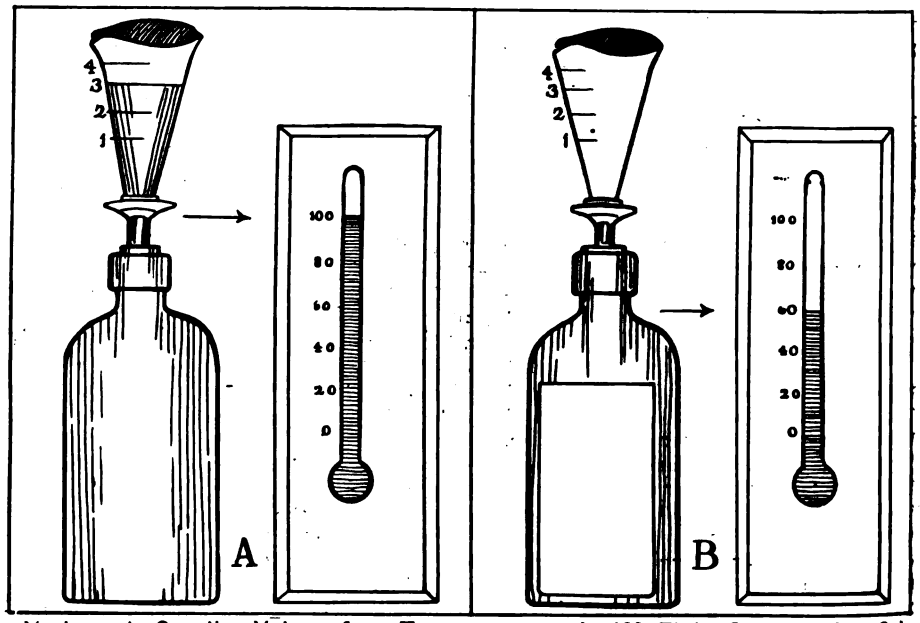
In ordinary conditions three remedies are practical. The one that is often recommended is putting a quarter of a pint of glycerine into the radiator and let it remain there for a week or two, running the engine frequently on the road. Then the mixture of water and glycerine may be drained from the system and the radiator flushed thoroughly and refilled with pure water.

Another method, and this is most commonly employed, is to dissolve two large handsful of washing soda in a pail of boiling water. This should be stirred thoroughly with a flat stick. The solution should then be strained and after the radiator drainage cock has been closed it should be poured into the filler cap. The engine should then be run for 10 minutes with the throttle a quarter open. The ignition switch is then opened and the engine allowed to stand for 10 minutes. The engine is next run for 10 minutes as before, after which the solution is drained from the radiator. The system should then be flushed and refilled with pure water.

An engine cooled with a thermo-syphon system should be warm when it is to be cleaned with this solution, so that circulation shall be begun immediately after the engine shall be started. The soda solution is very effective in loosening scale. After the solution has been drained the radiator and water jacket should be filled with a hose introduced into the filler cap. The engine should then be run for a short time and drained again to remove all of the soda, though no damage would be done were it not entirely removed, though it might possibly cause deterioration of the rubber hose and connections.

In rare case the pump of a force water circulation will fail, due to the stripping of a gear or the shearing of a key on the pump shaft. At intervals the pump shaft and the pump should be examined to determine their condition. Once a year, at least, it may be necessary to repack the glands or stuffing boxes at each end of the pump shaft. Again, merely tightening the gland nuts will stop leakage, but care should be taken not to tighten these more than is absolutely necessary, as the leakage will not be due to loosening of the gland itself, but to worn packing. One had best renew the packing than attempt to stop the leak by tightening the gland nut too much. The packing is usually made of candle wicking soaked in melted tallow, or heavy cotton twine similarly treated, or special packing may be obtained at a service station. After the nut has been turned to press the packing there is no reason to turn it more, for doing so might damage the water pump.

With the approach of cold weather the cooling system of any car or truck should be examined and whatever repairs necessary made. An engine may be 85 per cent. efficient, but this value is lost if the cooling system is neglected in any way.



Variance in Gasoline Volume from Temperature: A, 128 Fluid Ounces (One Gallon) at 100 Degrees Will Fill Bottle, Tube and Graduate to the Level Shown; B, but Same Volume, Cooled to 60 Degrees Fahrenheit, Will Measure 124 4/5 Ounces, Filling the Bottle to the Top, a Shrinkage of 3 1/5 Ounces, or About 2½% in Volume.

VARIATION IN VOLUME OF GASOLINE AT DIFFERENT TEMPERATURES.

The companies distributing gasoline to consumers transport this fuel in dark colored tank cars and tank wagons and store it in elevated tanks that are exposed to the sunlight and heat, and the retailers as a rule store gasoline in underground tanks, buried from five to 10 feet deep in cool soil. This being the case, one can understand that the retailer buys heated "gas" and sells it at considerably lower temperature during a part of the year at least, this resulting in a loss through contraction of the fuel.

An experiment was recently made to determine what would be the loss if a change of 40 degrees temperature should be made in a volume of gasoline. The result obtained showed a shrinkage of approximately 3⅛ ounces (fluid) in a gal-

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lon, or expressed in terms of money, two-thirds cent a gallon at a price of 25 cents a gallon . This may appear to be a very small fraction, but in the aggregate it represents a considerable amount. One will understand that the shrinkage of fuel delivered from tank wagons at 85 degrees temperature and later sold at 55 degrees, if bought at 22 cents and sold for 25 cents, reduce the profit of the dealer from three to 2½ cents a gallon.

As an illustration, take a summer's day when the temperature is 72 in the shade, the temperature of a volume of five gallons, exposed to the sun two hours, increased to 140 degrees, while that just pumped from an underground tank was 65 degrees Fahrenheit. With these conditions noted one can see that during the summer months with high temperatures, there will be considerable loss from contraction of volume. The cooler the weather when the purchase is made the greater the loss. The private owner of an underground tank can gain slightly by buying as much as possible when the fuel delivered by the tank wagon will be cool and will require the least space. One can note the difference in volume of gasoline due to expansion and contraction by the accompanying sketch of bottles and thermometers.

HINTS AND TIPS.

Tire Conservation.

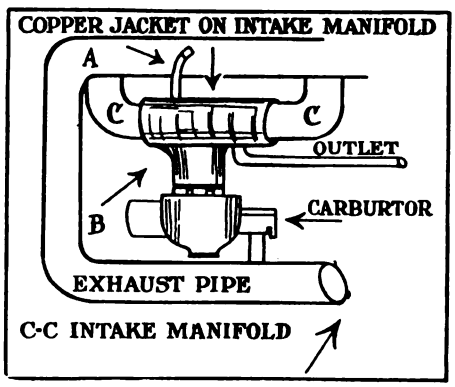
The constant chafing of tire tubes against the inner walls of shoes is the cause of a considerable part of the trouble that is realized by owners, even with the highest priced standard makes of tires. If the friction and the heat caused by tube and shoe chafing can be minimized there would be greater wear and considerably decreased expense, to say nothing of the greater satisfaction that would obtain. Tire manufacturers recommend the use of pulverized mica, soapstone, talc and similar powders, that, sprinkled in the shoes, serve as lubricants and keep the surface in contact from wearing and heating. Better than any of these, however, is a special form of flake graphite, which has been recently placed in the market, which will form a smooth coat or veneer on both surfaces and reduce the friction to the lowest practical degree. The more the graphite is rubbed the greater the degree of polish, and there can be no adherence between the tube or shoe.

Heating the Carburetor.

A considerable percentage of the cars built in 1912 are still in use. Unless these are equipped with devices for pre-heating the fuel there is considerable difficulty in obtaining satisfactory operation. The average gasoline obtainable is heavy and slow to vaporize and good carburetion is not practical unless there are some means for heating the fuel as it is introduced into the engine cylinders. Five or six years ago there was comparatively little attention given to fuel vaporization aside from what was obtainable in the average carburetor. This change of opinion is not due to engine design, but to the difference in fuel, and most of the cars built today are equipped with heated carburetors, heated manifolds, heated air ducts and numerous other means for increasing the temperature of the fuel as it is admitted to the engine cylinders.

There is no discounting the value of these devices, but there are those who do not change the equipment of their cars because they are apprehensive as to the expense. The simplest form of heating the fuel, and it has given extreme satisfaction to those who have utilized it and adapted their engines, is a hot air stove or jacket that may be fitted by the man who has some idea of the use of tools, but no especial mechanical training. Or after laying out the plan on paper one may take the plan to any garage man to do the work.

The stove is made primarily of a piece of sheet copper that is made almost circular in form, being about four inches long, fitting it around the intake manifold as one would fit a ring on a finger. A length of flexible tube, which is obtainable at any automobile supply store, 1½ inches diameter, which will vary in length from eight to 12 inches, according to the manifold design, with suitable connections at either end, admits the hot exhaust gas into the jacket, and being made of copper retains the heat longer. At



Home Made Hot Air Jacket for the Carburetor Manifold of Old Engines to Gasify the Present Day Heavier Fuel.

the opposite end of the tank is placed the outlet, which is a piece of thin metal tube ⅛ inch diameter. This is about a half inch long and being offset directs the gases away from the carburetor.

Improvised Carbon Brush.

Carbon brushes such as are used in magnetos and other electric apparatus of power vehicles may break or fail to function because of other causes remote from a garage or service station. Comparatively few drivers are thoughtful enough to carry a few brushes in their supplies of spares.

One may temporarily replace a broken or defective brush with one cut with a knife from the carbon electrode of a pocket flashlight cell, or from a carbon electrode of a standard type dry cell, or from the lead of a large sized pencil that is reasonably soft. From these the temporary brush is cut the length and width to fit the holder. If any of these suggested substitutes are not available one may use a metal brush, which may be made from any piece of soft metal or a bit of wire gauze that has been rolled as tightly as is possible.

One of the many important details to be remembered when scraping-in or refitting crankshaft bearings is the alignment, especially of the front bearing, which affects the timing gear. Begin the work on the front bearing, with the others lined with it, care being taken that the front bearing is so fitted that the gear on the forward end of the crankshaft meshes correctly with the other gears of the timing gearset.

Applying Tires.

When putting a tire on a rim that is diagonally split, first determine whether or not the rim is true or out of shape. If misshapen hammering will have to be resorted to after much of the work is done. Also make sure that the rim ends come together before any work is started. If trouble is experienced mount the tire as you would a clincher shoe. However, with some rims there is a tongue, which in turn drops into a slot of similar shape in the rim end. In the event the tongue is broken the rim can be used by causing the ends to butt, by using a jack as a spreader, and then soldering a piece of metal across the split ends to prevent them separating. This will serve if no other ring is at hand.

GENERAL MOTORS ABSORBS THE CHEVROLET.

The stockholders of the General Motors Corporation have voted to absorb the Chevrolet Motor Co., and this was in accordance with the plan by which the holders of Chevrolet stock receive 1 1/7 shares of General Motors common stock and 44 cents for each share.

The balance sheet of the Chevrolet Motor Co., as of Oct. 11, shows assets of $73,546,042, consisting of $278,042 cash and 732,680 charges of General Motors common stock valued at $73,268,000, and liabilities of 641,095 shares of capital stock valued at $64,109,500, and surplus and undivided profits of $9,436,542. A dividend of $3 a share on common stock of the General Motors Corporation was declared, payable Nov. 1, at the Guaranty Trust Co., New York City, and Chevrolet stockholders who do not convert their stock prior to that date will receive a cash equivalent on presentation of the

WILLYS-OVERLAND, INC., TO MOVE EXPORT OFFICES.

Because of the prospect for very greatly increased business following the close of the war the headquarters of the export department of Willys-Overland, Inc., is to be removed shortly to New York City. Export Manager R. T. Williams will locate in the metropolis, where he will be joined by E. C. Morse, who is now representing the Willys-Overland interests at Washington, and who will be connected with the export department.

The creditors of the Regal Motor Car Co., whose claims were secured by first mortgage gold notes, will be paid in full. The unsecured creditors will receive from 20 to 25 per cent. of their claims, according to statement by the Security Trust Co., Detroit, receiver for the company.

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Reports of Activities In the Motor Industry

The Air-O-Flex Automobile Corporation, Detroit, Mich., has located its offices at the factory.

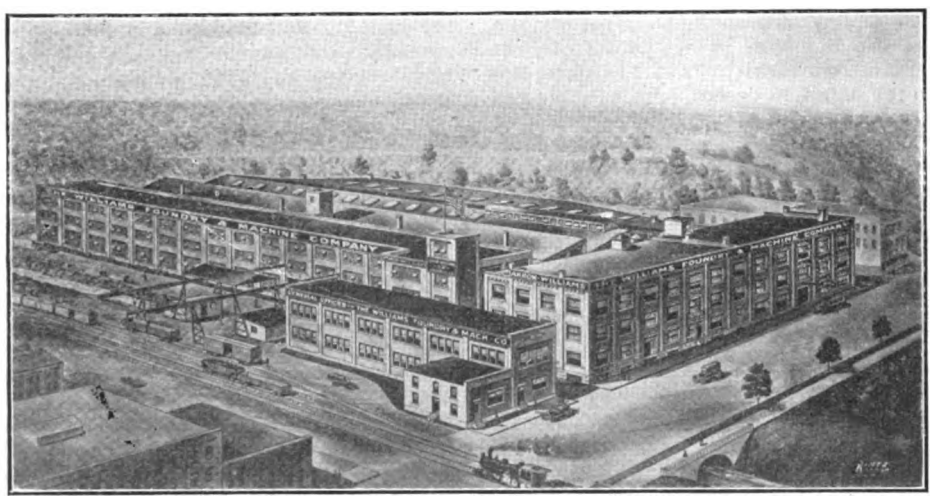
The O. J. Beaudette Co., Pontiac, Mich., has been awarded government orders for two types of transport bodies and for a touring car body. For several weeks past the company has not been in full operation, owing to curtailment of passenger car production. The company are manufacturers of metal motor car bodies.

The Mason Tire and Rubber Co., Kent, O., is manufacturing rubberized raincoats for the army. The company will turn out 1000 coats a day by the first of the year. Additional plant capacity has been leased for the duration of the war.

The Herff Motor Corporation, Memphis, Tenn., has taken over the State Automobile Co. The Herff company distributes the Briscoe and Elgin and has branches at Nashville, Tenn.; Little Rock, Ark., and Birmingham, Ala.

The Northern Foundry Co., Marinette, Wis., manufacturers of automobile castings, will double the capacity of its plant. The company has purchased the business and equipment of the Dost Pattern Works, Menominee, Mich. Bruno E. Dost is proprietor of the concern and he has joined the Northern company as pattern works manager. The company specializes in tractor and gas engine castings.

The Anderson Forge and Machine Co.,



The Plant of the Williams Foundry and Machine Co., Akron, O., Manufacturer of the Tire Making Machinery and Tools, Which Is Claimed to Be the Largest Operator of the Kind in the World.

The Central Machine and Tool Co., Toledo, O., is furnishing war plants with jigs, dies, snap and tolerance gages and special machinery for war work. The company is filling an order for special polishing machinery for a shell plant. Testing machines for shells and dies and reamers for shell cases are made. The president is William F. Pioch and George E. Walters has taken over the management of the company's operations.

The Champion Ignition Co., Flint, Mich., will erect a three-story addition to its plant to cost approximately $50,000.

The Simmons Manufacturing Co., Cleveland, O., has purchased a four-story building containing 28,000 square feet of floor space. The company manufactures repair parts for light trucks and passenger cars.

The Square Turn Tractor Co. has removed its executive offices from Chicago to its factory in Norfolk, Neb. The company will erect several new buildings.

The Auto Body Co., Lansing, Mich., has received a war order for truck bodies amounting to $500,000.

Detroit, Mich., has placed contracts for an addition to its office building and die shop on Jefferson and Conners Creek. War work and other activities has made it necessary to expand the plant.

The Schaefer Rubber Co., Cincinnati, O., has increased its capital stock from $50,000 to $100,000.

The G. A. Schacht Motor Truck Co., Cincinnati, O., is erecting a one-story factory addition, 75 by 250 feet. The new building will be used for assembling.

The Lone Star Motor Co., El Paso, Tex., has taken the state agency for the Lauson tractor and a stock of tractors and repair parts will be maintained at Dallas and Houston, as well as at El Paso. The Lone Star sells cars such as the Packard, Stutz, Hudson and Dodge Brothers. The president is E. Gordon Perry.

The Supreme Motors Corporation, Cleveland, O., will build a plant at Warren, O. The first unit will be built to meet war requirements. When peace comes the company plans to build a complete line of engines. The officers are: President, A. W. Green; vice president and general manager, C. H. Davies; secretary, C. F. Erickson, and treasurer, C. N. Mitchell.

The Cincinnati Auto Specialty Co., Cincinnati, O., has moved into new quarters, where it will have 20,000 square feet of manufacturing space.

A. R. Mosler & Co., New York City, has made a number of changes in its selling force and is now represented by the following men: F. G. Wright, New England; L. G. Falck, New York and Pennsylvania; J. E. Patton, Eastern Pennsylvania, Maryland, Delaware and Virginia; I. W. Becker, South Atlantic coast states; H. H. Meyer, Ohio and Michigan; F. S. Murray, Indiana, Kentucky and Southern Illinois; John Staff, Southwest; C. D. Parr, Nebraska, Kansas and Missouri; E. Gluckauf, Illinois and Northwest; M. L. Monger, Inter-Mountain; I. H. Sollish, New York City and New Jersey.

The Falls Motors Corporation, Sheboygan Falls, Wis., will erect a large addition to the plant. It will consist of a one-story shop addition, 120 by 275 feet, and it is the fourth important extension made within a year's time. The company is devoting most of its time to the manufacture of engines for government trucks and other army purposes.

The Steel Products Co., Detroit, Mich., is building a one-story machine shop 89 by 123 feet, to cost $30,000.

The Bucyrus Tire and Rubber Co., New York City, has leased the plant formerly operated by the Bucyrus Rubber Co. The company will manufacture tires, tubes and other rubber articles. The president and general manager is C. O. Henderson; vice president, Joseph Friedman, and secretary and treasurer, George C. Riley.

The Kissel Motor Car Co., Hartford, Wis., will erect a one-story warehouse building, 50 by 260 feet. The company is devoting practically its entire facilities to the production of F. W. D. trucks for the government.

The Detroit Lubricator Co. will erect a one-story shipping room, 104 by 120 feet. It will cost $25,000.

The United States Gear Shift Co., Eau Claire, Wis., has completed its new manufacturing plant. It is four stories high, 80 by 100 feet, and is equipped to manufacture the Laursen hydraulic gear shifting device for motor vehicles. The regular line of work will be undertaken as soon as the war requirements have been filled.

The John W. Lauson Manufacturing Co., New Holstein, Wis., has appointed agencies with the Gibbes Machinery Co., Columbia, S. C., for the Carolinas, and W. J. Dabey Implement Co., Atlanta, Ga., distributor of tractors, motor cars and farm implements.

The International Steel Products Co., Milwaukee, Wis., has broken ground for the erection of its new and permanent works in Hartford, Wis. The first unit will cost about $30,000. The company manufactures gas engine silencers and other accessories and parts of pressed sheet steel.

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And Happenings Among the Parts Makers

The Allen-Bradley Co., Milwaukee, Wis., will erect a shop addition, 65 by 100 feet, two stories high. It will cost about $40,000. The company manufactures electric controlling apparatus.

The Elkhart Carriage and Motor Car Co., Elkhart, Ind., is running night and day, Sundays included, so as to finish a government order of 4500 ambulance bodies. The manufacture of the Elcar is being continued.

The Langstadt-Meyer Manufacturing Co., Appleton, Wis., is enlarging its capacity by taking over the building occupied by the Appleton Motor Car Co. The entire building will be converted into a machine shop. The company manufactures farm lighting systems and direct connected generating units for other purposes.

The Kahlenberg Brothers Co., Two Rivers, Wis., has started the erection on a new assembling, testing and shipping building. The new building will be equipped with an electric traveling crane and the most modern testing equipment and accessories. They manufacture stationary oil engines.

The Pierce-Arrow Motor Car Co. has declared its regular quarterly dividend of $1.25 a share, payable Nov. 1 to stockholders of record Oct. 15.

The Lauson Tractor Co. has appointed the following agencies: W. R. Holmes & Son, St. Louis, Mo., Eastern Missouri, Southern Illinois, Kentucky, west of the Tennessee and a few counties in Northern Arkansas; Mountain State Motor Co., Charleston, W. Va., West Virginia; Dan W. Tait, Decatur, Ill., 19 counties in Central Eastern Illinois; Comsigny Motor Truck Co., Des Moines, Ia.

The Timken-Detroit Axle Co., Detroit, Mich., is erecting a two-story addition to its factory and a one-story addition to its foundry.

Charles B. Bohn Foundry Co., Detroit, Mich., is building a two-story addition to its foundry and a one-story core room at the plant.

The Sanford Motor Truck Co., Syracuse, N. Y., has placed the following new agencies as distributors of the Sanford trucks: Donahoo Horse and Mule Co., 2701 Second Ave., Birmingham, Ala.; W. L. Fanshawe, Box 269, 322 High St., Burlington, N. J.; Joe Willoford, Ardmore, Okla.; J. H. Lincoln, Jr., Henryette, Okla.; Isaac Plasterer, Lebanon, Pa.; L. A. Farley, Lancaster, Pa.; Elano Zimmerman, Manheim, Pa.; Herr Bros., Quarryville, Pa.; Central Garage, Clinton, Conn.; C. E. Norton, Guilford, Conn.; Raoul M. Delagrange, Stonington, Conn.; Frisbie-McCormick Co., Norwich, Conn.; Martin B. Dodd, Norfolk, Conn.; J. F. Falconer, Springfield, Mass.; K. W. Osgood, 673 Connecticut Ave., Bridgeport, Conn.; Mr. Dell, Dell's Garage and Service Station, Hartford, Conn.; S. L. Benedict, 73 N. Main St., S. Norwalk, Conn.; New England Motor Sales Co., 23 Putnam Ave., Greenwich, Conn.; E. J. Denning, 55 W. Main St., Stamford, Conn.; Jefferson Auto Co., 27 Jefferson St., Waterbury, Conn.; Central Garage, 36 Third St., Derby, Conn.; Gilmartin & Day Garage Co., 127 Colony St., Meriden, Conn.; Wm. Luby, 9 South Colony St., Wallingford, Conn.; Park Avenue Garage, Meadville, Pa.; P. Mori & Co., Loyalhanna, Pa.; Woodling Auto Co., Haysville, Pa.; T. C. O'Rourke, Washington, Pa.; J. P. Mooney, McKeesport, Pa.; J. L. Culp, Indiana, Pa.; Elite Garage, Charleroi, Pa.; W. C. Laderer & Co., Butler, Pa.; Maurice Machine Co., Jeanette, Pa.; National Auto Co., Uniontown, Pa.; Rose Brothers Auto Co., Greensburg, Pa.; F. M. Robb, Latrobe, Pa.; Snyder Bonze Baker Co., Bellevue, Pa.; A. E. Sarver, Bellevue, Pa.; D. L. Shaffer, Kittaning, Pa.; Wells Mills Electric Co., Connelsville, Pa.; J. A. Stokes, Blairsville, Pa.; Myers Carriage Co., Franklin, Pa.; Carnahan Transfer and Storage Co., Oil City, Pa.; Overland-Warren Co., 617 E. Pennsylvania Ave., Warren, Pa.; Pooler & Emery, Skowhegan, Me.; O. F. Files, P. O. Square, Bangor, Me.

The Grand Rapids Brass Co., Grand Rapids, Mich., is erecting an addition to its factory. It will contain three stories and basement. The building will be completed in January.

The Grant Motor Car Corporation, Cleveland, O., declared a dividend of 1¾ per cent. on its preferred stock for the quarter ended Oct. 15, which was payable Nov. 1 to stockholders of record Oct. 20.

The Northwestern Chemical Co., Marietta, O., will erect a complete new building, to replace the one that was destroyed by fire in September. The building will be 50 by 150 feet and fireproof throughout. It will cost $35,000.

The C. R. Wilson Body Co., Detroit, is erecting a two-story factory 98 by 303 by 42 feet that will cost $250,000.

The Northern Electric Co. has been appointed distributors for Pasco wheels in the whole of Canada and will handle them in its Canadian branches.

The B. & H. Machine Products Co., Detroit, Mich., will devote its time to government machine production work. The company will manufacture parts essential to airplane and truck engines. The officers of the company are as follows: W. J. Baird, president; Andrew Baird, vice president and treasurer; Clay G. Howery, secretary and general manager.

The Gomery-Schwartz Motor Car Co., Philadelphia, Pa., is now distributor for the Knickerbocker Forma-Tractor, which is designed to be attached to a Ford passenger car in 15 minutes. The company will give, during this month, public exhibitions in its territory, which includes Eastern Pennsylvania, Southern New Jersey, Delaware and Maryland.

The Motor Mercantile Co., Salt Lake City, Utah, was recently organized. It is an exclusive jobber of automotive parts, equipment and supplies, which are sold only at wholesale. The territory operated in comprises the Inter-Mountain states. A. D. McMullen is president and general manager, V. A. Culver sales manager and G. G. Hansen, formerly buyer for Chanslor & Lyon, San Francisco, will do the buying.

The Sheldon Axle and Spring Co., Wilkes-Barre, Pa., is erecting a new machine shop. The floor area will be 85,152 square feet, which is about twice the floor space of the present machine shop. This addition will increase production at least 30 per cent. Only machining of axle parts will be done in the new building.

The National Acme Co., Cleveland, O., has declared a quarterly dividend of 1½ per cent., which will be payable Nov. 30 to stockholders of record Nov. 15.

The Schaefer Rubber Co., located at Detroit and Cincinnati, O., has increased its capital stock from $50,000 to $100,000.

The John Lauson Manufacturing Co., New Holstein, Wis., has placed contracts with the McBee Engine and Implement Co., Memphis, Tenn., for Western Tennessee and Mississippi; Charles Gray, Little Rock, Ark., for Central Arkansas, and the Holt Motor Co., Watertown, S. D., for 29 counties of that state.

The Avery Co., Peoria, Ill., is now employing women and many are doing the same work as the men. In every department women are employed. They are shoveling sand in the foundry, do most of the welding, place the tubes in the radiators and operate lathes in the machine shop. The women generally wear overalls. The plant has been equipped with every facility required or desirable for the comfort of the women workers, whose welfare has been carefully regarded.

The Dorpian Motor Truck Co., Schenectady, N. Y., has been organized to manufacture a truck. The company has a capital stock of $100,000 and the incorporators are: G. L. Sidebothen, L. Basset and W. Harrington.

The Stromberg Carburetor Co. of America reports net earnings of $431,533 for the nine months ended Sept. 30, 1918, as compared with $318,819 for the 12 months ended Dec. 31, 1917.

The Wolverine Tractor Co., Detroit, Mich., at its annual meeting held recently, elected the following directors: W. J. Wickles, Arnold Boutel, W. E. Laur, C. A. Bigelow, W. E. Wood, W. G. Wagenhals, W. F. Austin. The company has been capitalized for $300,000.

The Cleveland Galvanizing Works Co., Cleveland, O., has changed its name to the Chain Products Co., that its name will be more descriptive of the products. F. G. Hodell is president, H. H. Hodell is vice president and W. F. Schneider is secretary.

The Williams Foundry and Machine Co., Akron, O., has greatly increased its manufacturing space, facilities and its volume of business. The company specializes in equipment for tire factories and is one of the largest manufacturers of this class of machinery in the world, making machines or tools required for every purpose in tire making and repairing.

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MOTOR TRUCK SALES MANAGERS ESTABLISH OFFICE.

A permanent office has been established at 1314 Wells building, Milwaukee, Wis., by the recently formed National Association of Motor Truck Sales Managers, which is in charge of Executive Secretary J. M. Carney, who directs all of the routine of the organization.

The objects of the association are numerous, but the activities are largely with the view of formulating policies which will be at least a guide for the members in their dealings with sales representatives and buyers.

One proposition that will receive careful consideration is that the association develop a uniform dealers' agency contract. There are those who question the widely diversified methods the vogue in the trade, and believe that far better results could be obtained were forms and practise standardized. This could also be applied to sales on time payment.

The unification of sales methods would also include those dealing with what is known as "trading," in which new vehicles are exchanged for used machines and cash or securities in some form. These are all subjects that affect the manufacturers to a greater or lesser degree, and naturally there will be exchange of policies and views.

There is no reason to believe that the determinations will be reached quickly, for they are too important and far-reaching to be decided without careful consideration. But the main purpose of the association, if realized, will be simplification of sales methods and assurance of uniform dealing.

REED TRACTORS WILL BE FIRST SHOWN AT KALAMAZOO.

The first Reed farm tractors, built by the Reed Foundry and Machine Co., Kalamazoo, Mich., will be shown for the first time at the annual convention of the Michigan Vehicle and Implement Dealers' Association, which will take place at Kalamazoo, Dec. 3-5. The new machines will be exhibited by E. L. Rose, sales manager of the tractor department, who has sent notices to all members of the association directing their attention to the machines. No statement has been made as yet concerning the type, capacity, design or construction of the Reed tractor.

STUDEBAKER DEVELOPS NEW LIGHT SEDAN.

The Studebaker Corporation is preparing to produce a new sedan type body that is to be used on the series 19 light four chassis. This is one of the first of the bodies developed during the progress of war and other work in readiness for stimulating sales. A considerable number of concerns have produced similar equipment, which will be shown as rapidly as possible. The new Studebaker sedan has a mechanical lifting device for converting it into an open touring car, so that conversion can be quickly and easily accomplished.

ELECTRIC VEHICLES WANTED BY FOREIGN BUYERS.

There is apparently a very good market for electric vehicles in some of the foreign nations if one is to base judgment on the interest manifested by concerns abroad. The Anderson Electric Car Co., Detroit, has within a few days received inquiries from firms that it had been negotiating with previous to this country engaging in the war upon Germany. In most instances the companies wanted to consummate purchases that had been proposed, and sought to have shipment of the machines, all pleasure cars by the way, forwarded as quickly as possible. The company last week sent the last of an order of 40 cars to Norway, and several days later it received a cable from the buying concern asking if more machines could be shipped. Evidently there is a boom in electric vehicle use in the Scandinavian peninsular.

PIERCE-ARROW EARNS $2.74 A SHARE OF COMMON.

For the three months ending Sept. 30, 1918, the Pierce-Arrow Motor Car Co. earned $2.74 a share on its common stock. The operating profits for the period was $1,338,129, against $1,809,729 for the corresponding period of 1917. After deducting various charges and war taxes the surplus was $886,759, which was equal to $2.74 on the 250,000 shares of common stock, after allowing for the dividend requirements for the preferred stock. During the preceding three months the earnings were $2.85 a share on the common stock, against $5.94 for the same period a year ago, but from which the war taxes were necessarily deducted.

CAR MANUFACTURERS NOTIFIED OF PRODUCTION BASIS.

As quickly as possible after the certainty of a return to pre-war conditions the War Industries Board notified the different interests of the automotive industry of the basis on which production could be resumed for the time being, so that there should be as little delay in the plans for manufacturing what had been greatly or wholly curtailed. The first announcement related to manufacturing until the first of the coming year, and as quickly as is practical further notices will be given so that conversion of essential production can be made with the least effect upon business.

HARE ASSUMES DUTIES AT THE PACKARD PLANT.

Emlen S. Hare, who was recently elected a vice president for the Packard Motor Car Co., has assumed his duties at the big plant at Detroit. Mr. Hare was for two years president of the branch of the Packard company at New York, and previous to that time was located with the company in Philadelphia. Prior to that connection he was connected with the Commercial Truck Co. of America, Philadelphia, manufacturer of electric trucks.

WILLYS-OVERLAND PLANS FOR ERA OF BIG BUSINESS.

The Willys-Overland Co., which was for a considerable time very largely engaged in war work, is planning resumption of passenger car production on a greatly increased scale. The statement is made that it will build a small Overland car in very large numbers. This machine was first exhibited a year ago at New York and it is stated that it will be turned out as quickly as materials can be obtained.

H. V. Hawk, purchasing agent for the company, while in Detroit, stated that the works would be converted from war production as rapidly as possible and manufacturing of machines begun in quantity. He said concerning the future: "We placed our cards right on the table, and in this war business played fair with the government. We did not store material preparatory to the present situation and must therefore get away to a standing start. I am now laying the lines for material for an increased production over our former manufacturing, as our company has reason to believe that the demand for cars is going to exceed any demand ever known before."

FORD PLANT WILL FINISH ITS EAGLE BOAT CONTRACT.

The contract made by Henry Ford to build submarine chasers, a type of small vessels to be known as Eagles, which is under way at the River Rouge, Mich., and Kearney, N. J., will be completed, according to Secretary of the Navy Daniels. The greater number will probably be built at tidewater rather than inland, because of the cost and the difficulty of delivering them to the Atlantic coast from the Michigan plant. Besides the Great Lakes are closed to navigation more than four months of each year and the craft cannot be accumulated on the ways in large numbers, although there is a launching well at River Rouge.

BIG BONUS DISTRIBUTION FOR GOODRICH EMPLOYEES.

Statement is made that the end of the year the B. F. Goodrich Rubber Co., Akron, O., will distribute bonuses to its employees that will aggregate approximately $2,000,000. The individual bonus will be about 25 per cent. of the year's wage. One of the reasons for this liberality is said to be the very patriotic response made by the employees to the appeals for subscriptions to Liberty Bonds and purchases of War Savings Stamps.

WILLYS CONTROLS NEW PROCESS GEAR CORPORATION.

The New Process Gear Corporation, Syracuse, N. Y., one of the largest concerns engaged in gear production, has been acquired by John N. Willys, president of the Willys-Overland Co., Toledo, O., and there is reason to believe that he will continue the operation of the works with little change of policy. The company is capitalized at $3,000,000 and it is one of the substantial industries of Syracuse.

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FOREIGN TRADE SHRINKAGE DURING OCTOBER.

The value of imports into the United States during October amounted in value to $247,000,000, as against $221,000,000 for the same month of 1917, and $262,000,000 for September. The exports for the month were $503,000,000, as against $542,000,000 for October, 1917, and $550,000,000 for September.

During the 10 months ending with October the imports were in value $2,569,000,000, as against $2,504,000,000 for the same period in 1917, and for the same period the exports were $5,063,000,000, against $5,146,000,000.

WILLIAMS, DODGE FOREIGN SALESMAN, RETURNS.

After an absence of 15 months, during which he visited England, South Africa, Spain, Portugal and South America, E. G. Williams, foreign district representative for Dodge Bros., has returned to Detroit. He is preparing to develop business relations he established during his stay abroad.

BAIRD MACHINERY CO., OCCUPIES WHOLE BUILDING.

The W. J. Baird Machinery Co. has acquired possession of the entire building at Brush street and Jefferson avenue, Detroit, which has 75,000 square feet of floor space. The company deals in wood and metal working machinery and tools, transmission machinery and manufacturers pottery equipment. The concern is said to be one of the largest in the United States.

ADDITIONS TO STANDARD TRUCK PLANT.

An addition is now being made to the works of the Standard Motor Truck Co., Detroit, which is located south of No. 1 plant. The structure will be 65 by 175 feet and as soon as this is completed a second unit of like dimensions will be started. The rapidly increasing business of the company, according to President A. Fisher, has made the erections necessary. The buildings will be given over to general purposes.

ERSKINE MAY BE DIRECTOR OF FEDERAL BANK.

The business men, bankers and those prominent in industrial enterprises in Detroit and that section of the country of which the city is the commercial center, have indorsed President Albert R. Erskine of the Studebaker Corporation as a director for the Federal Reserve Bank at Chicago.

BORNHOLT JOINS BUICK CO.

O. C. Bornholt, who was for a considerable period factory manager for the Holley Brothers Co., Detroit, manufacturer of carburetors, has been engaged as mechanical expert by the Buick Motor Co., Flint.

Army Officers Find a Fuel Superior to Gasoline

Statement is made at Washington that a fuel oil claimed to have qualities superior to gasoline, which has been given the name of "Liberty Fuel," has been developed by Maj. O. B. Zimmerman and Capt. E. C. Weisgerber of the research and development division of the general engineering department at the national capital.

According to this statement this oil is the result of experiments extending over a period of five months, and that during these experiments what may be regarded as every practical test has been conducted with internal explosion engines built for automobile vehicles, stationary work, airplanes and other purposes.

Maj. Zimmerman is attached to the United States Reserve Engineer Corps and is a well known authority on internal explosion engines practise. He has written extensively of the general subject of engines, and is extremely well qualified to judge the merit of the fuel. Being in the service of the government he has no personal interest other than what would obtain to the automotive industry as a whole from what was developed expressly as a resource for the government in its war against Germany.

Maj. Zimmerman, while he has been quoted with reference to results from the fuel, states that the credit for production should be given Capt. Weisgerber, who is a very well known gas and oil engineer. In a general way he confirms a discovery that will be a great benefit to the people. The method of production is possessed by the War Department. Whether it will be made known to the oil producers, so that they may produce fuel in larger volume (which would seemingly mean a reduction in the price of engine fuel), cannot be stated. Statement is made that the fuel is now being produced in large quantities for the use of the government.

The fuel has a base of kerosene and it is a combination of oil, specially treated, that has superiority to any other that can be produced in large volume for commercial purposes. Maj. Zimmerman is quoted as saying: "There'll be no more gasless Sundays now that Liberty fuel has been discovered. Liberty fuel acts completely as a gasoline substitute. It is odorless, tasteless and non-corrosive. It leaves less residium of carbon than any gasoline, requires less air or oxygen for combustion and develops greater horsepower. The force of the explosion has been found to be 30 per cent. greater than gasoline."

RIPPINGILL RETURNS TO THE HUDSON COMPANY.

After a considerable stay at Washington, where he was engaged almost continuously since the beginning of the war with Germany, E. V. Rippingill, assistant sales manager of the Hudson Motor Car Co., has returned to Detroit and resumed his duties with that concern.

SALE OF CARS IN FAR EAST.

"Motor Vehicles in Japan, China and Hawaii," is the title of a booklet just published by the Bureau of Foreign and Domestic Commerce of the Department of Commerce, which deals with the sale of motor vehicles as a business in the countries specified. The business is not large in number of machines, for many American cities have more than both China and Japan combined, but there is prospect of great growth and it is important that America maintain the lead with its production of medium and low priced cars.

Thus far Hawaii has been a better market than either Japan or China, and is a worth while locality for development. The general agitation for the construction of good roads is expected to result in a constantly increasing demand for power vehicles. The report is written by Tom O. Jones and it is extremely valuable for one doing business or considering trade connections in the Far East. Copies may be obtained from the office of the superintendent of documents, Government Printing Office, Washington, D. C., at request, enclosing 15 cents in coin or money order, or from any of the district offices of the Bureau of Foreign and Domestic Commerce, with the same enclosure, specifying S A. Series No. 170.

FORD COMPANY RESUMES THE PRODUCTION OF CARS.

The Ford Motor Co., Detroit, has resumed the production of passenger cars and is beginning to distribute machines in small numbers to its branches and sales representatives. The first shipment made from the factory consisted of approximately 25,000 machines, which has been built for government use, but which was cancelled upon the cessation of hostilities. This was a very fortunate condition, for it gave Ford dealers machines which were believed to be unobtainable.

SEEKING AUTOMOTIVE TRADE FOR BRITISH INDIA.

Any concern interested in the production or sale of automotive equipment and machinery and who desires representation in British India, can communicate with P. C. Sawyer of Hill, Sawyer & Co., Bombay, who is now in the United States making trade connections. He can be reached in the care of J. B. Crockett Co., Inc., 44 Whitehall street, New York City. The concern operates in a large way in a considerable section of India.

RAW MATERIALS IMPORTED SHOW BIG INCREASE.

During the nine months ending Sept. 30 raw material valued at $944,000,000 for use in manufacturing was imported into the United States, which was a very great gain in value as compared with the total for the corresponding period in 1914, when the total was $482,000,000. The volume, however, was very little changed, the seeming great increase being accounted for by the steady advance of prices.

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TRUCK TIRES

New, Fresh Standard Makes Slightly Blemished

Size	List Price	Our Price	Size	List Price	Our Price
32x3	$39.20	$23.50	38x3	$52.14	$27.60
32x3½	45.90	27.50	38x3½	61.60	36.95
32x4	52.80	31.70	38x4	62.50	37.50
34x3	41.30	24.75	38x5	79.20	47.50
34x3½	48.55	29.10	38x6	95.85	57.50
34x4	55.95	33.60	38x7	118.80	71.30
34x5	70.10	42.05	40x3½	64.35	38.60
34x6	85.45	51.30	40x4	65.65	39.40
36x2½	33.75	21.45	40x5	83.50	50.10
36x3	43.65	26.20	40x6	101.15	60.70
36x3½	51.25	30.75	40x7	121.50	72.90
36x4	59.05	35.45	42x2½	40.00	25.00
36x5	74.90	44.95	42x4	77.00	46.20
36x6	90.70	54.40	42x5	87.70	52.60
36x7	108.05	64.85	42x6	106.95	64.20
36x10 Giant	228.20	135.00	42x7	128.15	76.90

Solid Tires for 30x3½ Clincher Rims, $20.00

Special Discounts on Quantity Orders. Dealers' and Fleet Owners' Prices on request. We will gladly call on Dealers and Fleet owners and explain our proposition. A postal will bring us.

Mail Orders sent C. O. D. subject to inspection. Send in your wheels. We return same day as received with tires applied. Express paid one way

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Best Service in New England

We Guarantee to Reduce Your Tire Cost Per Mile

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CANCEL ARMY TRUCK CONTRACTS

STATEMENT is made that the War Department of the government has authorized the cancellation of contracts existing and contemplated for 81,000 trucks for army service. The total number covered by contracts and proposed contracts is not stated. In some instances new orders, authorized or proposed, have been withheld. Some contracts for which work has been begun, have been modified, the number of vehicles being reduced approximately one-half.

The following statement includes but a small part of the contracts, but it is sufficient to show to what extent the industry will be affected through the cancellation and modification of contracts. The total number of vehicles included in these contracts was 15,935, and with the cancellation of orders given the Peerless and Garford company for 3000 and 4000 1½-ton trucks, and the reduction of the others 50 per cent. the total that will be produced will be 4568.

Contractor	Order	Load Rating	Modified Order
Federal Motor Truck Co.	500	3½	250
Federal Motor Truck Co.	300	5	150
Gramm-Bernstein Motor Truck Co.	100	3½	50
Hurlburt Motor Truck Co.	200	5	100
International Motor Co..	200	2	100
International Motor Co..	800	2	400
Kelly-Springfield Motor Truck Co.	920	3	460
Kelly-Springfield Motor Truck Co.	340	1½	170
Moreland Motor Truck Co.	40	2½	21
Moreland Motor Truck Co.	60	4	30
Packard Motor Car Co...	3,000	3	1500
Peerless Motor Car Co...	500	3	250
Peerless Motor Car Co...	2,000	1½	*
Republic Motor Truck Co.	250	5	125
Standard Motor Truck Co.	300	3½	150
Velie Motors Corp.	125	3	63
Pierce-Arrow Motor Car Co.	1,100	2	700
J. C. Wilson Co.	200	2	100
Garford Motor Truck Co.	4,000	1½	*
Total	15,935		4,568

*Cancelled.

The situation with reference to the automotive industry in bald facts is this: Following the policy established by the government many of the concerns building passenger cars converted their manufacturing departments as nearly as possible to the 100 per cent. war basis required by Jan. 1. The truck manufacturers planned and were preparing to do all the essential war work possible in addition to building the trucks allowed by the order of the War Industries Board.

Cessation of conflict, the armistice and the collapse of Germany means that these industries must resume normal manufacturing operations as quickly as possible. If government work ceases entirely there will be an interim of inactivity, with enforced idleness of labor, unless some of the work authorized by the government can be continued. In other words, if government work is terminated by cancellation of existing contracts labor will be idle unless other employment can be found.

Because of this fact quick action has been necessary and constant conferences have been held by the War Industries Board, the Automotive Products Section of the board, the War Department, the United States Employment Service and other bodies that have jurisdiction and can control the situation largely through the contracts existing.

The National Automobile Chamber of Commerce, representing the industry, has been extremely active because of the uncertainty of the interests until a definite policy has been announced by the government. The National Automobile Chamber of Commerce has a committee consisting of Hugh Chalmers, Alvan MacCauley of the Packard Motor Car Co.; H. B. Jewett of the Paige-Detroit Motor Car Co., Ray D. Chapin of the Hudson Motor Car Co., Col. Charles Clifton of the Pierce-Arrow Motor Car Co., representing the passenger car manufacturers, and George H. Graham of the Pierce-Arrow Motor Car Co.; Windsor T. White of the White Co., L. H. Boylston of the Service Motor Truck Co., S. M. Williams of the Garford Motor Truck Co., and A. C. Burch of the Clydesdale Cars Co., representing the truck manufacturers.

This committee has held conference and formulated a statement that has been presented to Chairman Bernard M. Baruch of the War Industries Board, which statement has not been made public. It reflected the conditions which the industry must meet as forecasted by the members of the committee, and the relief that must be assured to protect labor during the adjustment of the different enterprises incidental to resumption of normal production.

From the viewpoint of national economy cancellation of all contracts and termination of, or at least minimizing, expenditure of all kinds would appear to be desirable, but at the other hand the government has compelled the industry to cooperate with it and this has necessitated cessation of normal operations, so that there is not only the obligation of the government to protect the industry, but the imperative need of protecting labor as well.

The industry can only be assured by the determination of extremely important (to the industry) policies, one of which is the disposal of vehicles now owned by the nation and in war service, which will be in large part unnecessary after the demobilization of the army in this country and the termination of active operations abroad. If the trucks bought for the army are placed in the markets and sold for such prices as may be offered for them, there would undoubtedly be disruption of the industry for a long period of time, because of the uncertainty of demand and the unwillingness of manufacturers to build machines that could not be sold because of the high prices that would be necessitated by war period cost of materials and the wages demanded by labor.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUG. 24, 1912, OF

AUTOMOBILE JOURNAL,

PUBLISHED MONTHLY AT PAWTUCKET R. I.

For October 1, 1918.

State of Rhode Island, County of Providence.

Before me, a Notary Public, in and for the state and county aforesaid, personally appeared William H. Black, who, having been duly sworn according to law, deposes and says that he is one of the owners of the Automobile Journal, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above captain, required by the act of Aug. 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business managers are:

PUBLISHER, WM. H. & D. O. BLACK....Pawtucket R. I.

EDITOR, E. K. BROWN.....Providence, R. I.

BUSINESS MANAGER, WM. H. BLACK..Pawtucket, R. I.

2. That the owners are:

WM. H. BLACK.....Pawtucket, R. I.

D. O. BLACK.....Pawtucket, R. I.

3. That the known bondholders, mortgagees and other security holders owning or holding one per cent. or more of total amount of bonds, mortgages or other securities are:

M. J. BLACK, Mortgagee.....Pawtucket, R. I.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given: also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association or corporation has any interest direct or indirect in the said stock, bonds or other securities than as so stated by him.

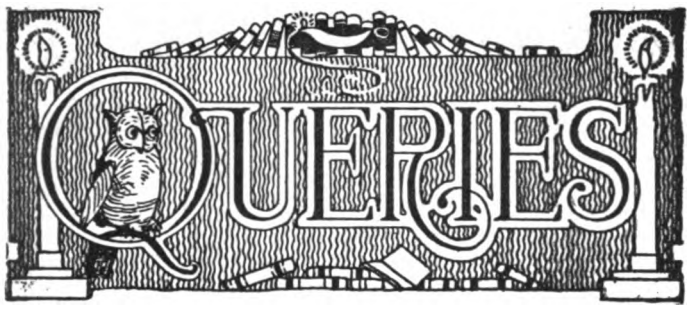
(Signed) WILLIAM H. BLACK, Co-Partner.

Sworn to and subscribed before me this 4th day of October, 1918.

(Signed) THOMAS BESWICK, Notary Public.

[Seal] (My commission expires June 30, 1920.)

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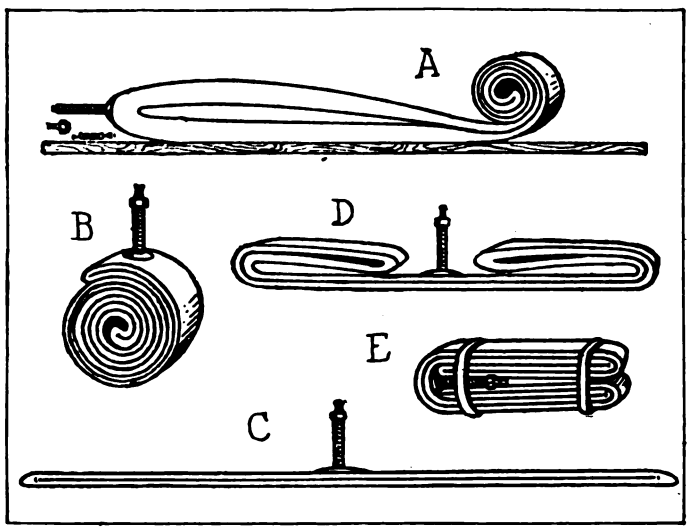


PROTECTING EXTRA TIRES.

(E. G. B., Indianapolis, Ind.)

As tire manufacturers and persons repairing same say to keep tubes protected and free from chafing when carried as extras on the car, will you kindly state in your journal a good method of doing this? I have done as advised by a tire repair man and taken out the valve of my tubes and rolled them up, but even so am unable to get a very small bundle out of it.

You have been advised correctly. In fact it is absolutely necessary to keep extra tubes well wrapped up and protected from rubbing against other articles in the tool box, which might chafe the tube or cut into the edges of same. A very good method to follow in doing this and the way that is usually done is as follows: First, remove the valve insides from the tube and flatten the latter out so that the valve stem will be at one end. In this position commence at the other end and roll it tightly towards the valve stem as shown in A, until it is rolled as shown in B. Now, being sure that all air is out of the tube, replace the valve insides so that no air will enter. The next thing to do is to flatten the tube out again, but this time with the valve stem in the center as shown in C. Beginning at either end fold the tube over onto itself once as shown in D and then fold both sides onto themselves with the stem in the middle as shown in E, holding in place with a couple of elastic bands. To carry this in the tool



Proper Method of Folding Tubes for Storage.

box or in any place where there is a possibility that it will come into contact with other objects it should be wrapped up. Preferably this should be done first in a newspaper and then all wrapped in a strong cloth, being tied together with a string or piece of hemp. This will keep the tube dry and clean and also be a great protection from chafing. If there is a hole or puncture or other opening in the tube of course it will be impossible to roll the tube up tightly as herewith directed, as the air will enter the tubo as fast as it is forced out. In fact, this will probably answer your implied question. You probably have been unable to wrap your tube up tightly because as soon as you had forced all the air out of the tube you did not replace the valve insides, which is essential.



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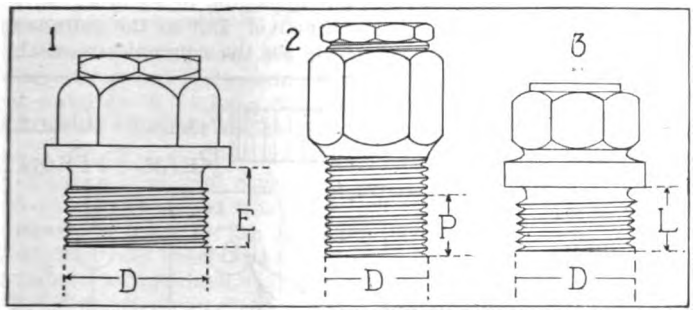
A. C. CHAMPION SPARK PLUGS.

(H. K., Cleveland, O.)

I am interested to know what "A. C." stands for on the Champion spark plug; and also how many different style threads are used on spark plugs? Could you make a sketch of them in the next issue of The Automobile Journal?

"A. C." is a trade mark that was originated by Albert Champion, who first manufactured the Champion spark plugs, it being the initials of his name. These plugs were first made in Boston and later the factory was established at Flint, Mich.

There are three types of spark plugs commonly manufactured commercially, the one being known as the ½-inch pipe size, the second the metric and the third the S. A. E. standard. From the accompanying sketches one will note the characteristics of each type. With reference to these, spark plug diam-



Three Types of Spark Plugs: 1, S. A. E. Standard Size; 2, ½-Inch Pipe Size; 3, Metric Size.

eter is assumed to be the size of the shell. The following specifications are sufficiently clear:

One-half-inch spark plug sizes—D, diameter at end, .815 inch; P, length of thread, ⅝ inch; taper, ¾ inch per foot; threads, 14 per inch, V form, slightly rounded at top and bottom, depth .057 inch.

Metric size—D, diameter, 18 millimeters (.708) inch; L, length of thread, about ⅜ inch straight, no taper; threads, 1.5 pitch (about 17 per inch), V form.

S. A. E. standard—D, diameter, ⅞ inch; E, not less than ½ inch; F, not more than ⅛ inch; length of thread not less than ⅜ inch, straight, no taper; threads, U. S. standard, 18 pitch.

OILING SYSTEM OF OLDSMOBILE DEFENDER.

(J. T. C., Attleboro, Mass.)

Would you explain the oiling system of the Oldsmobile Defender, model 1912? The system I wish explained has a pressure gauge on the dash, no splash and all bearings have small pipes leading to them. What produces the pressure that forces the oil through the leads? I do not see any pump.

This system has a plunger pump that is driven by a cam on the camshaft, that is operated much the same as a valve tappet. The pump plunger is lifted by a spring and is forced down by the cam as it revolves.. The pump is located on the left side of the engine case at the forward end, and if you will look into the oil filler you will note a screw slightly below the top. This screw adjusts the pumpage, as seating it increases the volume of oil forced by the pump each revolution and unseating it (backing out the screw) reduces the volume. Wide variance can be made in the volume of oil pumped by turning the adjusting screw. The pump itself is attached to the lower section of the engine crank case, and is removed when the lower section is taken off.

From the pump, of course, the oil is forced through the different leads and through the system to the different main points of lubrication. Considerable oil is thrown off and distributed about the interior of the engine by the centrifugal force of the revolving crankshaft.

FIRING ORDER OF COLE EIGHT.

(J. E. M., Atlanta, Ga.)

Will you publish the firing order of the 1915 Cole eight-cylinder motor, and show a diagram of how this is laid out, in an early issue of your magazine, which I have read constantly for the past six years. I have derived much benefit

Does it Lubricate the first Five Minutes

THAT'S the question that floors common grease. Grease has to be partly melted with frictional heat before it acts at all.

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begins to lubricate the instant the car starts and prevents bearings from heating. NON-FLUID OIL provides positive protection to all parts from frictional wear and reduces power consumption.

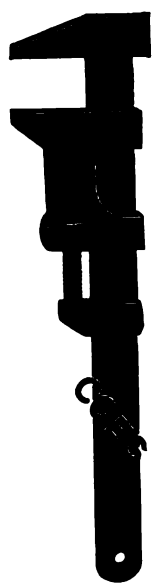


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PAIGE

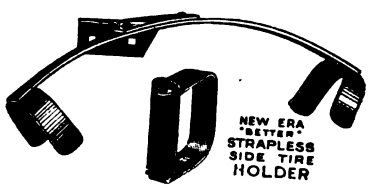
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The Paige-Detroit Motor Car Company, Detroit

New Era "Better" Strapless Side Tire Holder.

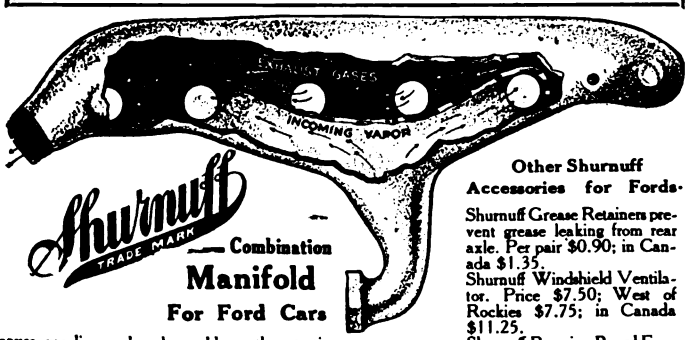


Made of steel, has no cast parts to break and no straps to wear out or be lost. The locking device is a part of the tire holder. Tire easily slips into place and is quickly adjusted. A convenient, light tire carrier that has many exclusive advantages. Self-expanding carrying rim can be furnished extra where demountable rims are not used.

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Shurnuff Windshield Ventilator. Price $7.50; West of Rockies $7.75; in Canada $11.25.

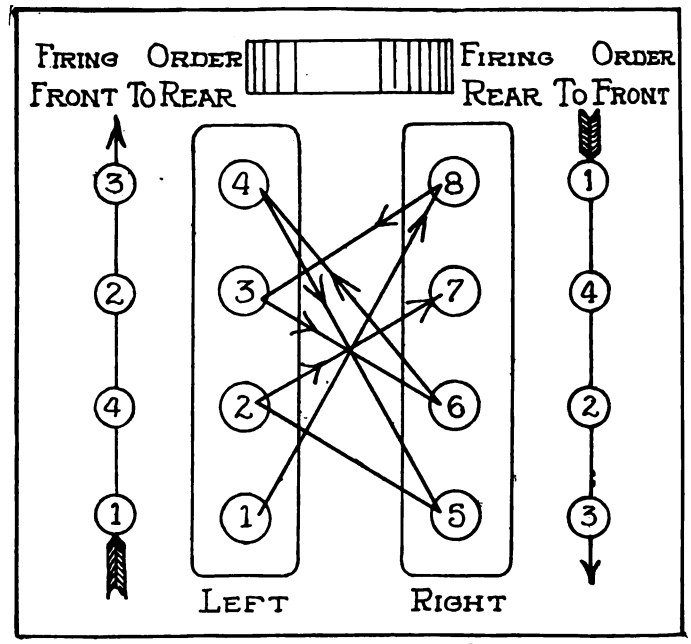
Shurnuff Running Board Fender Supports prevent sagging and vibration of front fender. Per pair $4.50; West of Rockies $4.75; in Canada $6.75.

SHURNUFF MFG. CO. Dept. E ST. LOUIS, MO.
Sales Dept. THE ZINKE CO., Chicago, Ill.

from the correspondence and practical suggestions department.

In the Cole Eight 1915 engine the two blocks of four cylinders each are set side by side and slanted at an angle to form a V, with the valves inside. The cylinders on one side are reversed with reference to the cylinders on the other side. Standing at one end of the engine the firing order of one block is 1-4-2-3. Passing around to the opposite end of the engine, the firing order of the other block will be the same as the first named block, that is, 1-4-2-3. For the convenience of the operator of the car the maker of the Cole Eight numbers the cylinders of the bank at the left of one standing in front of the radiator or engine from 1 to 4 (1-2-3-4) and those in the other bank 5-6-7-8, counting from the front.

Any eight-cylinder motor must fire alternately on the banks, and beginning with the first cylinder of the left bank and the last cylinder of the right bank, the firing order is, in the order of cylinders, as shown above. But as the cylinders have been numbered consecutively for the convenience of the



Firing Order of an Eight-Cylinder Cole Engine.

car operator, when the firing is referred to by the manufacturer, as will be noted in the accompanying sketch, the firing is, 1-8, 3-6, 4-5 and 3-7. Or, to put it in another way, no matter at which end of the engine the operator may be standing the first cylinder to fire is the first of the left bank, and the second is the last of the right bank. The order from these two cylinders thereafter is 3-4-2 alternately on the banks.

COOLING SOLUTIONS FOR WINTER.

(S. A. M., Dane, Wis.)

Please give me a chemical mixture for an automobile radiator that will not freeze at zero and is not harmful to the motor.

A solution for an automobile cooling system that will not freeze at zero may be made as follows:

Water, 70%; wood alcohol, 30%; freezing point, nine below zero.

Water, 65%; wood alcohol, 35%; freezing point, 16 below zero.

Water, 70%; wood alcohol and glycerine in equal parts, 30%; freezing point, five below zero.

Water, 60%; wood alcohol and glycerine in equal parts, 40%; freezing point, 23 below zero.

Water-calcium chloride, three pounds to gallon, freezing point, two above zero.

Water-calcium chloride, four pounds to gallon, freezing point, 17 below zero.

Water-calcium chloride, five pounds to gallon, freezing point, 39 below zero.

Chemically pure calcium chloride will have practically no

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destructive influence on metal; chemically pure calcium chloride is much more costly than the commercially pure, the latter containing a varying volume of acid. This acid can be neutralized by adding ammonia or slacked lime to the solution until blue litmus paper wetted in it will not change in color to red. This test is unfailing and can be made any time.

When alcohol is used this will be more or less dissipated with use of the car or vehicle and the proportion lost should be restored. The test of the liquid is specific gravity, a reading of .960 by hydrometer indicating 33 per cent. wood alcohol and .950 41½ per cent.; a reading of .960 by hydrometer indicating 30 per cent. denatured alcohol and .950 38 per cent.

DIFFERENTIAL GEARS ARE NOISY.

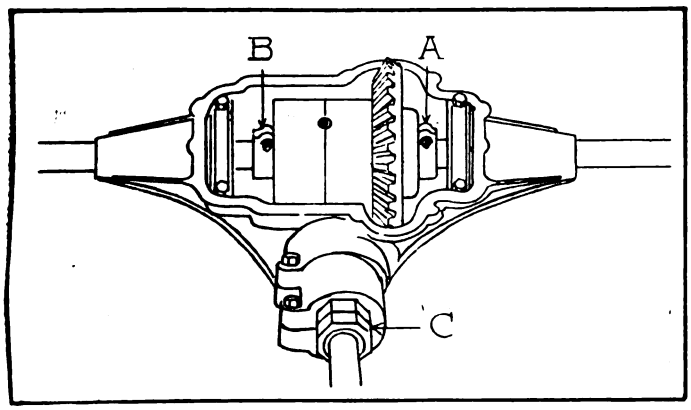
(P. W. W., Staunton, Va.)

What is wrong with the differential of my car? It is noisy in operation and the housing becomes too warm for me to put my hand on it. I have not attempted to do anything to it, and would like your advice before proceeding to fix it.

There are several causes for noisy differentials, but there can be only two good reasons why the housing should become unbearably hot. In the last mentioned case it is apparent that either the bearings fit too tightly or there is urgent need of lubricant. Although all differentials are not constructed alike, the principle of operation is generally the same, and, therefore, you can find assistance in the sketch published on this page. Assuming that the heat is due to the gears being meshed too deeply, which is more than likely the case, then you should make adjustments as suggested in the following:

When the master gear is too deeply in mesh with the driving pinion, the bolts on each adjusting collar should be loosened and the adjusting collar, indicated by A in the sketch, should be turned to the right, thus forcing the whole housing, with the master differential gear attached, further away from the driving pinion. After the proper adjustment has been made the collar indicated by B in the sketch should be securely tightened and collar A turned to the left until it is tight against the gear, after which it should be turned back to the right until there is a play of about .005 of an inch. This back lash is absolutely necessary; without it friction would develop between the collars and the roller bearings and produce heat.

Sometimes it will be found that the driving pinion gear is



Cut Away View of a Typical Differential Type, Showing Means of Adjustment.

not meshing with the master differential throughout its entire surface, and this must be compensated for by the pinion gear adjusting collar. Generally this collar is controlled by two nuts, located at the point of the housing marked C in sketch, where the drive shaft enters. One of these nuts acts as a lock, while the second is the real adjusting member.

If after these adjustments have been made the assembly is still noisy, it is probably due to the gears being badly worn, in which case the only practical remedy is to have them renewed.

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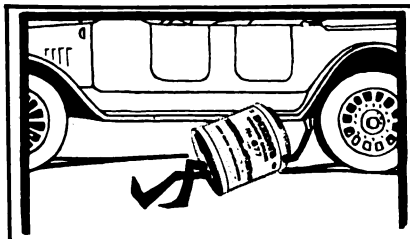
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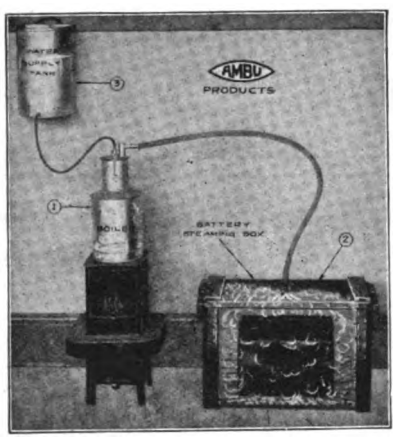
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1032 Wabash Ave., Chicago.

Makers of AMBU Electrical Trouble Shooter.

REMOVING CARBON WITH OXYGEN.

(H. M. Y., Harrisburg, Pa.)

Will you kindly advise how oxygen is used for cleaning carbon from cylinders?

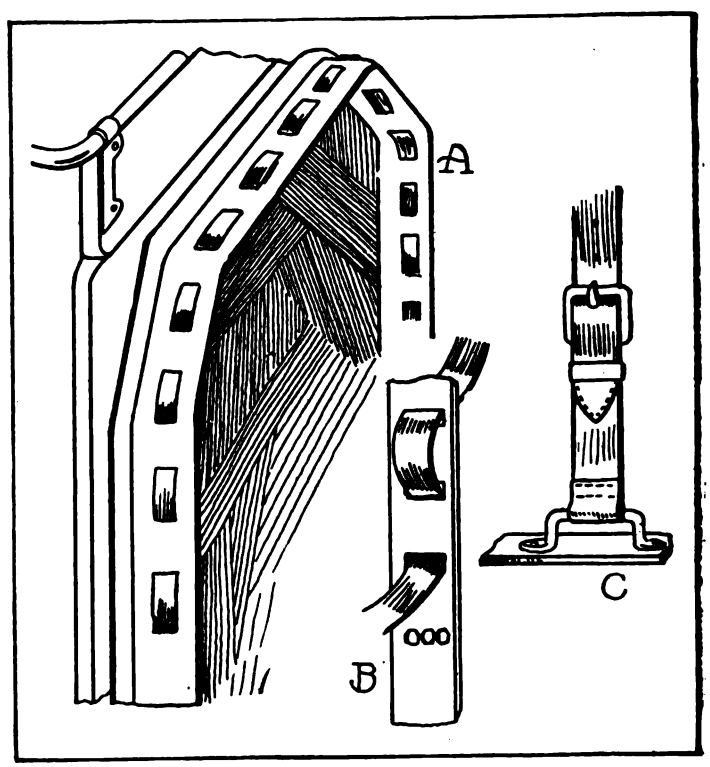
It requires special equipment to remove carbon from the engine by the oxygen method. The oxygen is stored in a large cylinder to which is attached a hose connection and a metal nozzle. The spark plugs are removed from the engine cylinders and the nozzle inserted through the opening. The oxygen coming in contact with the carbon forms a mixture which is ignited by inserting a lighted taper or match into the cylinder. The carbon and oxygen combine and burn, forming a gas which passes off and leaves the cylinder clean.

HOODS THAT RATTLE.

(A. E. S., Trenton, N. J.)

How can I stop the rattling of the hood on my automobile? The car is an old one and the hood is a long affair. The side clasps appear to be snug fit, but the hood rattles when I go over rough places. Would a bonnet strap stop the racket?

Though a hood strap, as suggested, should eliminate the rattle referred to, a better method would be to equip the dash and radiator supports of the hood with some anti-noise material, such as leather or raw hide. Possibly you might adapt the method some makers of the past utilized on their cars. They slotted the hood supports and wove in belt lacing, as shown at A in the sketch. At B is shown how the metal may be prepared for the leathers. Drill one or more holes, then



Illustrating Method of Preventing Rattling of Hood.

break out the edges with a small chisel, afterwards smoothing the rough places with a file. The lacing should be knotted at one end and inserted as illustrated.

A hood strap could be applied easily and would not be very expensive. A handle, such as illustrated at C, which also shows the fitting of the strap, is attached to each board supporting the hood and to these is sewed the strap, which is made in two sections. One is equipped with a buckle and the other perforated.

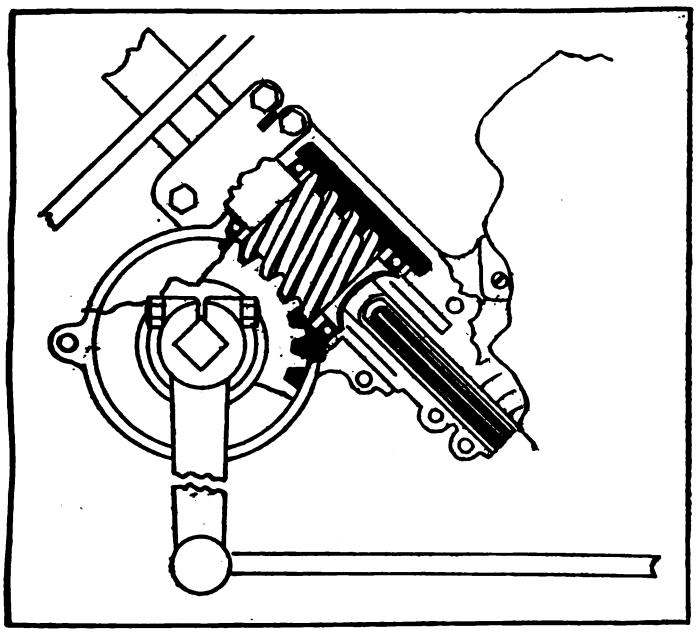
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IRREVERSIBLE STEERING GEAR TYPE.

(I. B. H., Syracuse, N. Y.)

I have just received my first automobile and, of course, am quite "green" about its mechanism. When the salesman of the ——— company was selling the car to me he spoke of the importance of the irreversible steering gear with which the machine is equipped. I have forgotten much of what he said, but remember that he was very earnest about it. Will you explain what the irreversible gear is and why it is the best?

With the introduction of the irreversible steering gear type there came into automobile practise a greatly increased measure of safety in driving. The chief feature of this type is that when the front wheels strike obstructions that ordinarily would tend to deflect their straight ahead course and wrench the arms of the driver, the gear holds the wheels steady; that is why the term irreversible was aptly applied to it. The principle of construction of the irreversible type does not vary greatly from the other type, the difference being in the employment of a worm gear on the steering shaft that engages with a toothed wheel to which the steering arm is attached. This is explained in the accompanying sketch. With this type of gear installed there can be no backlash from the front wheels and consequently it relieves the driver of the necessity of keeping a firm grip on the steering wheel at all times, which is a considerable saving in nervous energy.



Illustrating the Irreversible Type of Steering Gear Used on a Popular Priced Car.

CHANGING GEARS SLOWLY.

(J. D. B., East Orange, N. J.)

I own a four-cylinder 17 series Studebaker car and cannot change from low to second without grinding gears. Can you tell me how to change silently?

The general experience with this type of Studebaker car is that the best results can be obtained by reversing the practise found satisfactory with a very large number of other machines. That is, instead of the change being made quickly, which with the Studebaker construction will cause the gears clashing, the change should be made slowly, so that the gears will be approximately equal in speed before they are meshed. This will be found true with all changes of gear ratio from low to high. You can quickly learn just what can be done and the change will be perfectly silent if you take time for the operation.

STA-TITE Piston Rings

Play an Important Part in the Success of America's Leading Automobiles, Motor Trucks and Tractors.

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The strength and power of any motor depends largely on its compression. Perfect Compression means an efficient, clean, smooth running motor.

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THE Piston RING COMPANY
SPECIALISTS IN PISTON RINGS

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22 A



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For following Cars:

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And Be Insured Forever

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The AUTOMOBILE JOURNAL

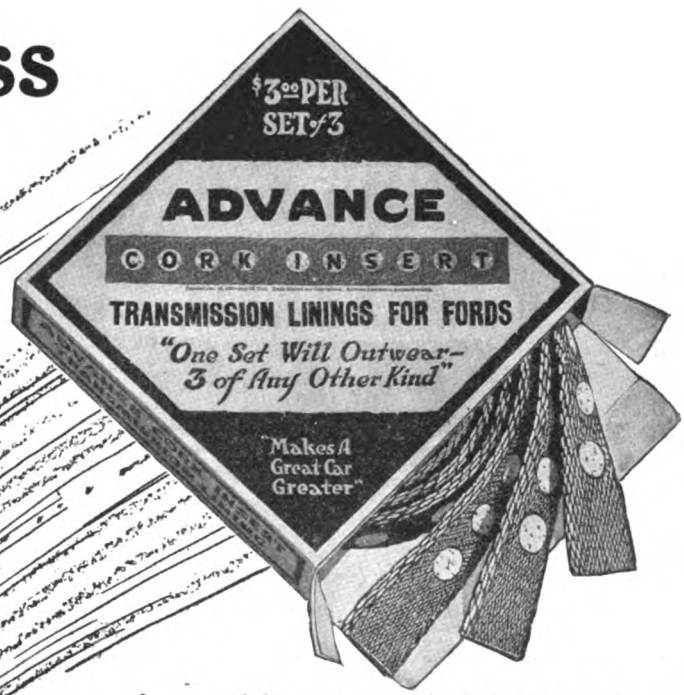
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Advance Automobile Accessories Corp.

Dept. M 3, 56 East Randolph Street, CHICAGO



$3 per Set of 3

Rockies West, $3.25—Canadian Price, $4.50



$1

for 1917-18 Fords
85c for 1916 and earlier Fords

Canadian Prices: 1917-18 model, $1.50; earlier models $1.25

Smooth Action, Sure Brake, Long Wear

—that's the service that Cork Insert Transmission Lining gives. When you apply the brake, the corks hit the brake drum first. They compress gradually and ease the load down to the fabric. The light pressure required, and velvety smooth action of the buttons of cork coming in contact with the drums, means such long wear that Cork Inserts are far the cheapest in the long run.

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Retards overheating. Most motor trouble is caused from overheating. This is due in no little degree to loss of driving power —estimated as high as 25% to 50% — because ordinary fan belts slip and stretch. Cork Insert Fan Belts stop the slipping. It doesn't have to be run light to prevent slipping, like ordinary belts. This, plus its durable construction, means extra long wear and economy. Cork Insert Fan Belts outlast all others — hence economical.

CORK INSERT

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MOTOR
OILS



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Woolworth Building

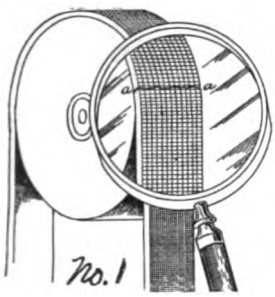
CHICAGO
1132 W. 37th Street

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How does a fan-belt break?



It breaks straight across—because that's the way it hinges on the pulley. Sketch number one shows you a belt with the fabric running lengthwise and across. You can see in a minute that the strain is all on one set of threads.

The other sketch shows you a belt cut on the bias and the breaking tendency is across two sets of threads, which gives double the strength.



Did you ever try to tear cloth on the bias? You can't do it—and that's why we make Vulco-Cords on the bias. That's the reason Vulco-Cords don't pull in two.

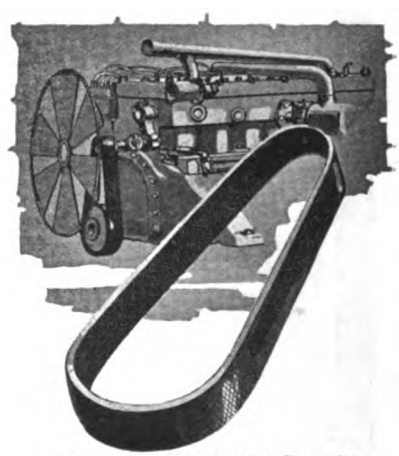
That's why we can guarantee Gates Vulco Cord Belts to outwear three ordinary belts.

And the bias construction of Gates Vulco-Cords is one of the patented features of our process. No other belt can be made that way.

Made only by

GATES
Rubber Company
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"Worlds Largest Makers of Fan Belts"



Pat. in U. S. and Foreign Countries

DENVER 1918

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The Replacement Spring



VULCAN QUALITY AUTOMOBILE SPRINGS
IN STOCK FOR YOUR CAR

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The Display rack and Service Sign is Furnished **Free** with the first order, including appropriate advertising helps.

America's Motorists

have been educated by national advertising to look for VULCAN Service signs when in need of Spring Replacements.

Performance of VULCAN Springs on their cars has convinced them of the Superiority of VULCAN.

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are profiting by the demand created through national advertising, combined with supreme quality of VULCAN Springs and convenience of VULCAN Service.

VULCAN Service

embraces the needs of both motorists and dealers, supporting each to the highest degree of efficiency. A constant stock of over 100,000 VULCAN Springs furnishes the source of supply. The individual supremacy of each spring, because of the "built in" quality, assures satisfaction to user and distributor.

Become a VULCAN Dealer and enjoy the benefits of a ready made market.

Write for particulars regarding VULCAN.

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It is the acknowledged American authority on highway haulage

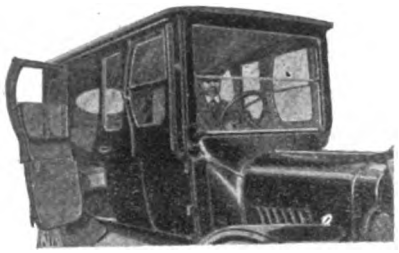
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Immediate Delivery Guaranteed.

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The repair work turned out of this shop is of the highest merit—because I know how. If you have electrical and magneto troubles, no matter whether it is a

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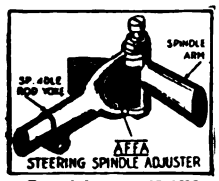
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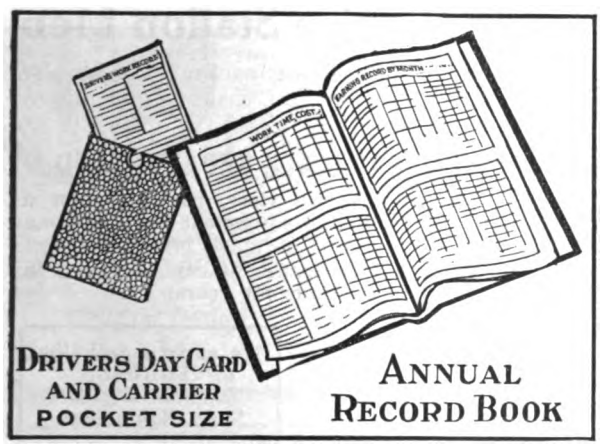
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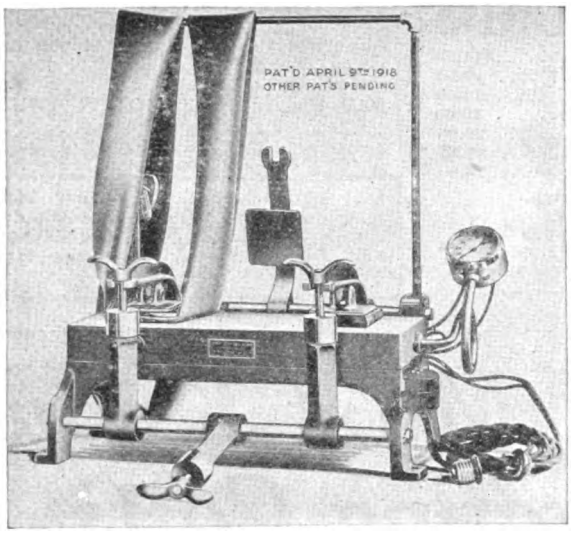
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DEALERS, REPAIRMEN, GARAGEMEN



The Heintz Automatic Electric-Steam Vulcanizer will add a

MONEY MAKING DEPARTMENT

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The "American" Combination Bearing Burning-in and Motor Test and Running-in Stand for Ford Motors

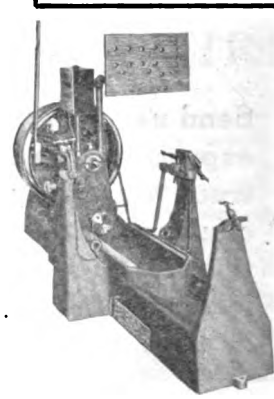
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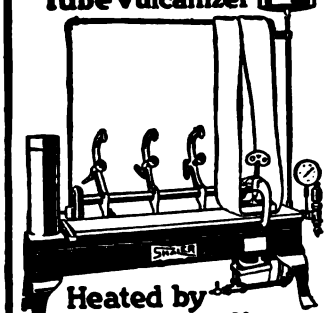


Service Station Equipment Company, Inc.

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Has automatic heat control—no danger of explosions or damaging tubes. Anybody can operate it—does quick work—has large capacity and makes money fast.

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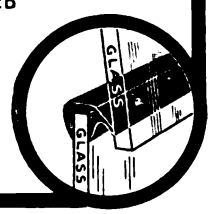


STOPS THAT LEAK
Thru the Windshield

The McCormick-Allmand Patented Weatherstrip is a necessity for every car. Now is the time it sells like hot cakes. Big profits.

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PATENTED

made of rubber for both regular and off-set type (Ford Cars) windshields. Closes space on windshields making it absolutely watertight. Fits any space or thickness of glass. Easily put on and off.



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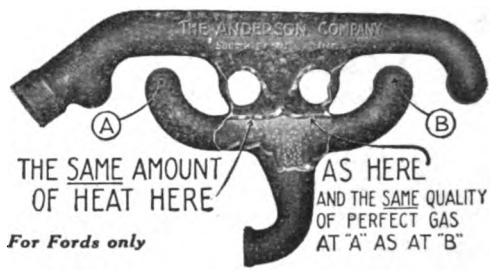
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Like the **even heat** manifolds used with great success for perfect gasification of present stubborn gasoline **in all seasons and climates** and as standard equipment on the famous LIBERTY MOTOR, the official U. S. truck motors and on the engines of **late** CHALMERS, STUDEBAKER, HUPMOBILE and other well known cars—the ANCO **requires no attention or adjustments** by the user. The ANCO is the only non-adjusting one-piece manifold licensed to use for the FORD engine this vital **even heat** construction shown below, on which patent is pending.



For Fords only

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Swift-moving heavy unvaporized particles of gasoline all strike the horizontal wall, called the "hot spot," which entirely separates the **hot** exhaust and **cold** intake channels. Shattering impact and intense heat combine to force instant and complete gasification. Note carefully how each half of this wall, right and left from the center, gets the **same** amount of heat, and how each cylinder gets the **same** high quality of gas—the **even heat** principle adopted by highest authorities named above as vital to best results in **hot** or **cold** weather.

GIVES INSTANT POWER

eagerly responsive to your slightest touch—a smooth-flowing, economical power that speaks a healthier engine, with cleaner pistons, spark plugs and valves, and crank case free from dangerous slugs of liquid gasoline. The Anco hand book tells you why. Ask for a copy.

Retails at $9.75



Rockies and West $10.50

Nicely finished and packed complete (gaskets included) in a substantial sealed shipping carton.

Free Dealer Helps Attractive store signs, interesting sales manuals, convincing folders, striking window display cards and other excellent sales helps are supplied promptly to all Anco dealers.

Dealer Wires Jobber: *"Anco manifolds going like 'hot dog' sandwiches on a cold day at a public sale. Express twelve more QUICK. Have two more orders in. A lot more sold and none to put on. RUSH."*

If your jobber hasn't yet stocked the Anco, order direct, giving his name.

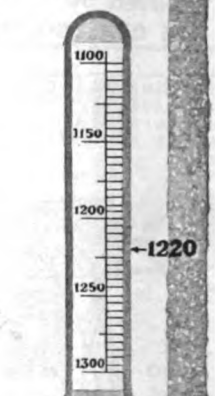
THE ANDERSON CO.
203 S. St. Joe St.,
South Bend, Ind.

Saves Gas-Prevents Carbon-Adds Power and Speed

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It's Easy to Sell—because the Motorist can Test It



CONSIDER what a powerful sales argument it would be to say to a motorist, "Here is a non-freeze solution that is absolutely sure and perfectly safe, *because you can test it.*"

That is just what you can do with Norwesco "TWELVE-TWENTY", the radiator solution that prevents frozen radiators. It can be tested quickly and accurately with an ordinary battery hydrometer—easily kept at the right strength to protect to 20° below zero—no guesswork whatever, like there is with other non-freeze solutions.

NORWESCO TWELVE-TWENTY
PREVENTS FROZEN RADIATORS

has none of the drawbacks of the ordinary solutions commonly used. It has no tendency to "find" radiator leaks. It requires no mixing or dissolving—just pour it right out of the can into the radiator. Does not evaporate rapidly like alcohol mixtures, as its boiling point is 12° higher than water.

Such a non-freeze solution offers a big opportunity for the dealer. Easy to sell. Satisfied customers—no comebacks.



Reputation of "Chemically Correct" Line Has Been Tested, Too

Remember, "TWELVE-TWENTY" is backed by the reputation of SE-MENT-OL, the radiator cement; SKALEX, the radiator cleaner, and the rest of the Norwesco "Chemically Correct" Line.

If you are already handling "TWELVE-TWENTY", send us your name and address and your jobber's name so that we can forward all mail-order inquiries to you. If you are not yet carrying "TWELVE-TWENTY", write today for our Proposition. Be sure to name your jobber.

The Northwestern Chemical Company
712 State Street Marietta, Ohio, U. S. A.

We make it *easier* for you to sell by backing "TWELVE-TWENTY" with a big advertising drive in the Saturday Evening Post.

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THE AUTOMOBILE JOURNAL

VOL. LXVI. PAWTUCKET, R. I., DECEMBER, 1918. NO. 5.

JOBBERS CHANGE ASSOCIATION NAME

Philip H. Lyon New President of the Automobile Equipment Association—Propose $100,000 Fund to Defend Indicted Members

CHANGE of name was one of the principal results of the annual convention of the National Association of Automobile Accessory Jobbers at Chicago, Dec. 17 and 18. The members of what is the representative organization of the trade journeyed homeward from the Windy City as members of the Automobile Equipment Association, which name is believed to be more nearly descriptive of the businesses engaged in. The name abandoned implied the members dealt in what was incidental to power vehicle use instead of vehicle equipment, and was inadequate in that it did not imply some of the members are manufacturers as well as jobbers or distributors.

Another result was the election of officers and the board chosen for the year to come is as follows: President, Philip H. Lyon of Chanslor & Lyon Co., San Francisco, Cal.; vice president, R. H. Englehart of Seig Co., Davenport, Ia.; chairman of the board of directors, Robert A. Stranahan of Champion Spark Plug Co., Toledo, O.; vice chairman of the board of directors, J. Ernest Millen of John Millen & Son, Ltd., Montreal, P. Q.; directors, Fred Campbell of Fred Campbell Auto Supply Co., St. Louis, Mo.; Howard M. Dine of Dine-De Wees Co., Canton, O.; Edward A. Pegau of Western Automobile Supply Co., Omaha, Neb.; Louis Schwab of Stevens & Co., New York, N. Y.; J. Ernest Millen of John Millen & Son, Ltd., Montreal; Robert A. Stranahan of Champion Spark Plug Co., Toledo, O.; Joseph M. Bloch of Gibson Co., Indianapolis, Ind., and George Brunner of Brunner Manufacturing Co., Utica, N. Y.

The members discussed with seemingly considerable favor the proposition that they engage wholly in wholesale transactions and abandon their retail stores with which they are to some extent in competition with their own customers, this being a proposal to protect the retail dealer who buys at jobbers' prices against the jobbers who buy at manufacturers' prices and make two profits through operating retail stores. Discussion of the suggestion to abandon quantity discounts, this proposing to fix scales of prices for both jobbers and dealers so there would be no discrimination in purchasing, was engaged in, but no decision was reached.

The classification of manufacturing members as "associates," they paying smaller dues and not receiving traveling expenses and the fee of $5 for attending meetings was abandoned, and all members will have equal privileges, but traveling expenses will not be paid unless the members remain through the sessions of the organization. Another condition imposed was that no member should be allowed convention expense bills who did not submit the voucher within 30 days after the convention.

One subject that received considerable attention was the approaching trial of 21 different individuals or concerns, members of the association, charged with violation of the Sherman law, so-called, which prohibits price fixing by agreement, which will be begun in New York Jan. 6. The indictments apply to 21 persons and with them 16 concerns as well. The supposition is that these will all be tried together. The men, with one exception, have been active as officers or directors of the association and in their official capacities have, according to the accusations, violated the law.



W. Webster, Commissioner National Association of Automobile Accessory Jobbers.

Those under indictment are:

William M. Webster, Chicago, commissioner of the association.

Charles E. Faeth, Kansas City, Mo., former president, Motor and Machinists' Supply Co.

Edward C. Graham, Washington, D. C., former vice president, National Electrical Supply Co.

Sidney B. Dean, St. Paul, Minn., former president, Nichols, Dean & Gregg.

W. W. Low, Chicago, Electric Appliance Co.

William K. Norris, St. Louis, Mo., McQuay-Norris Co.

William Sparks, Jackson, Mich., Sparks-Withington Co.

Emil Grossman, New York City, former director, Emil Grossman Manufacturing Co., who has retired as head of that company.

F. Hallett Lowell, Jr., Newark, N. J., Klaxon Co., from which he has retired.

F. B. Caswell, Toledo, O., Champion Spark Plug Co.

Harrie R. Williams, Birmingham, Ala., with the Gibson Co., Indianapolis, Ind., when indicted.

Gibson Co., Indianapolis, Ind.

Richard R. Englehart, Davenport, Ia., Seig Co.

Grant F. Discher, Milwaukee, Wis., Gemco Manufacturing Co.

Henry P. Andrae, Milwaukee, Wis., Julius Andrea & Sons Co.

George E. Edmunds, Detroit, Edmunds & Jones Corp.

Arthur M. Moody, Boston, Wetmore-Savage Co.

J. Standley Clemence, Billings, Mont., with Ballou & Wright, Billings, when indicted.

Ballou & Wright, Billings, Mont.

Sidney F. Beech, Chicago, Motor Supply Co.

Thomas M. Brooks, Chicago, former president, Automobile Supply Co.

Fred Campbell and William L. Ferrier, St. Louis, Mo., Fred Campbell Auto Supply Co.

The association assumed the defense of the defendants under the indictments and a proposal to raise $50,000 resulted in $34,000 being contributed by members, of which amount approximately $28,000 has

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been expended. The members are generally favorable to subscribing to a fund to defend the accused men and concerns, and those active in the cause are willing to undertake to raise $100,000 more if that amount is necessary.

Of the defendants Messrs. Webster, Graham, Williams and Clemence are indicted as individuals, but all the others named, and the companies with which they were connected, are indicted, making a total of 38 indictments in all. Of the defendants all but J. Standley Clemence have been officers.

The following concerns were elected to membership: The Auto Leather Manufacturing Co., New York City; William A. Banfield & Son, Toronto, Ont.; Hill Pump Valve Co., Chicago; Pennsylvania Piston Ring Co., Cleveland, O.; Western Manufacturing Co., Oskaloosa, Ia.; Arrow Grip Manufacturing Co., Glen Falls, N. Y.; Inland Machine Works, St. Louis, Mo.; Anderson Co., South Bend, Ind.; Bussman Manufacturing Co., St. Louis, Mo.; S. H. Gilmer Co., Philadelphia, Pa.; John W. Brown Manufacturing Co., Columbus, O.; Copeman Laboratories, Flint, Mich., as manufacturers, and Archenbold Automobile Supply Co., Waco, Tex.; James Bailey Co., Portland, Ore.; Electric and Auto Supply Co., Birmingham, Ala.; Sudger, Gravel & Fils, Montreal, P. Q.; Motor Mercantile Co., Salt Lake City, Utah; Thomas J. Northway, Rochester, N. Y.; Washington Auto Supply Co., Washington, Ill.; Wholesale Auto Supply Co., Tampa, Fla.; Chicago Auto Equipment Co., Chicago; Herlinger Auto Supply Co., Cincinnati, O. The application of the Times Square Automobile Co., which was advocated in person by Jesse Froehlich, was laid on the table until the new meeting. This concern, which has 20 branches, is eventually to abandon retailing, according to Froehlich, who maintains that he now has control, and that there is a desire to conform to business practise that has the approval of the association, this applying to "price wrecking" and under selling the recognized market prices.

The proposition that manufacturers supply catalogue inserts was not approved, but the manufacturers will be permitted to supply leaves for the data books of jobbers' salesmen. The standardization committee made recommendation that the size of catalogues be not less than six by nine inches and not more than 7½ by 10⅝ inches. The manufacturers were urged by the committee to increase the size of numbers or whatever designate the contents of cartons, this to make for easy identification on shelves, and the use of the decimal system for packing goods because this simplifies records and accounting.

The association presented a handsome silver pitcher to Sidney F. Beech, the retiring president, as a testimonial of appreciation of his services in behalf of the organization. The next meeting of the members will be at Hot Springs, Va., either in May or June.

35 SHOWS PLANNED FOR 1919

Dealers of Many Commercial Centres Practically Units in Organization of Exhibitions to Promote Trade and Stimulate the Industry—Combination Displays for Benefit of All Interests the General Policy of Managers.

The next three months will be the most active the automotive trade has ever known. The dealers throughout the country have undertaken what will be without question the most intensive trade promotion the trade has ever engaged in.

In all sections of the United States where associations of motor vehicle dealers exist plans are making or have been determined to hold shows of passenger cars, trucks, tractors and accessories.

In many instances the associations have undertaken to organize exhibitions that will surpass in magnitude any previously held, and while these will be local shows in the sense that they will be controlled exclusively by dealer organizations, there is belief that the number of exhibitors and the character of the exhibits will be quite as interesting to the public as any expositions of previous years.

There is unanimous belief that there will be a large demand for cars and trucks despite the war prices; that the more the demand can be increased the earlier will the power vehicle production be stabilized.

The appended list of shows includes 35 separate exhibitions, and there is reason to believe that this number will be considerably increased. The main obstacle has been the comparatively short time both for manufacturers and dealers to prepare exhibits for and organize the different expositions.

One may point out that the passenger car production for 1918 would have been approximately 2,000,000 had not curtailment been necessitated by the war. The production for 1917 was about 1,750,000 vehicles. The industry cannot be expected to produce more than from 1,000,000 to 1,250,000 cars in 1919 because of the necessity of industrial readjustment. This in itself would seemingly have the effect of maintaining the existing prices.

The belief of the dealers is that the nation wants cars and trucks, and the best way to stimulate trade is a drive through local shows.

THOUGH the National Automobile Chamber of Commerce sought to discourage power vehicle exhibitions by determining not to hold shows in New York and Chicago, the members of the different organizations of dealers throughout the country have seemingly been a unit in demanding a continuation of the displays.

The National Automobile Chamber of Commerce is made up of manufacturing interests, undoubtedly informed of the conditions with reference to business, and with very accurate knowledge of the materials market. The readjustment of the different enterprises from war essentials to commercial production are undoubtedly better understood by the industrial interests, and without question the chamber based its determination on what was believed best. The manufacturers want to continue business with the least possible disorganization and desire to maintain their sales organizations intact if this can be done.

At the other hand the dealers who are concerned in preserving their own businesses, who have capital invested and realize that they must do all that is possible to stimulate and promote sales, believe that they should not wait for the manufacturers to approve exhibitions; that the best way of convincing them that business is obtainable is by ordering machines. Were shows abandoned there would be a considerable period, and what is regarded as the best of the year for the sale of vehicles, practically inactive, and though they cannot expect to receive the same support from manufacturers as in previous years with reference to what are known as national shows, these are so few that the dealers as a whole should not be guided by the attitude of the industry.

This aspect was chiefly responsible for the decision of the dealers' associations in New York and Chicago deciding to or-

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ganize exhibitions and to hold them at later dates than usual. The dates were advanced principally from the fact that the time for organizing was very brief as contrasted with previous years and there was desire to make the shows as large as possible. In some instances the dealers' associations have voted to include tractor departments, believing that there is large interest in agricultural machines and that divisions given over to them would attract many people from considerable distances who would not be sufficiently attracted by either cars or trucks or both.

Considering that hostilities have ceased and that peace has not been declared as yet, and that the different car and truck mnaufacturers have by no means reconverted their plant to commercial production, there may be some reason to apprehend limitations of output for a considerable period. There may be a scarcity of materials that will affect many of the plants, but there is belief that these possibilities ought not to be considered by the dealers. So far as organization of shows is concerned, men of broad experience are available in practically every large city, and the conference of show managers held late in November convinced the various associations that there was every reason to believe that no serious obstacles existed so far as holding exhibitions were concerned.

New York Show.

This show will be organized by the New York Automobile Dealers' Association and it will be at Madison Square Garden and the 69th Regiment Armory, a short block distant. From Feb. 1 to 8 inclusive will be a show of passenger cars and accessories and from Feb. 10 to 15 inclusive trucks and truck accessories. The show committee consists of Charles H. Larson, chairman; William C. Poertner, Walter C. Wood, Harry J. DeBear, R. J. Gilmore, H. R. Bliss, William M. Sweet and Charles A. Stewart. Mr. Sweet is chairman of the show committee of the Motor and Accessory Manufacturers, and Mr. Stewart is secretary of the Automobile Dealers' Association. Special balconies are to be built to afford additional exhibition space in Madison Square Garden.

Chicago Show.

The show at Chicago will be held under the management of the show committee of the Chicago Automobile Trade Association, and, as in previous years, at the Coliseum and the First Regiment Armory. The display of passenger cars and accessories will be from Jan. 25 to Feb. 1 inclusive, and from Feb. 3 to Feb. 6 inclusive trucks and truck accessories will be shown. The show will be managed by S. A. Miles, who undertook to do in less than four weeks what had usually taken from two to three months. The show has been sanctioned by the Motor and Accessory Manufacturers. The profits in part will go to the treasury of the association, and will be divided in part with the members of the association, the National Automobile Chamber of Commerce and the Motor and Accessory Manufacturers. During the show the annual meeting and banquet of the Motor and Accessory Manufacturers will be held at Chicago, and the National Automobile Dealers' Association will meet Jan. 28 and 29 at the Hotel La Salle.

Boston Show.

The Boston Automobile Dealers' Association and the Boston Commercial Motor Vehicle Association has decided to hold its annual exhibition at Mechanics' building from March 15 to 22 inclusive, and following the usual custom this will be a combination show of passenger cars and trucks. The general arrangement of the departments of the show will be continued. Applications for space have been received very rapidly and General Manager Chester I. Campbell, who has managed every Boston show for 14 years, states there is every reason to believe that the exhibition will be up to the standard of previous years. Because there is no other building available the show must be confined to one building, which necessarily limits both the car and truck departments.

Detroit Show.

The Detroit show will take place from March 1 to 8 and will be at the Crosstown Garage building, which is claimed to be the largest one-floor garage in the world. It will be under the management of H. H. Shuart, and there will be departments for passenger cars, trucks, tractors and accessories of all kinds.

Des Moines Show.

The show at Des Moines, Ia., will take place from Feb. 17 to 22 in the new Ford building, which has 115,000 square feet of floor space on the two floors that will be used. There will be departments for passenger cars, trucks, tractors and accessories.

St. Louis Show.

The show at St. Louis, Mo., will be organized by the St. Louis Automobile Manufacturers' and Dealers' Association and will take place from Feb. 24 to 28, inclusive. The secretary of the association, Robert E. Lee, is manager.

Montreal Show.

A show will be held at Montreal, P. Q., under the management of Thomas C. Kirby, secretary of the Montreal Automobile Trade Association, who has managed all previous exhibitions in that city. It will be at the Victoria rink and will be independent of the association, which decided not to hold a show this year. The show interest was such that Mr. Kirby decided to organize one and it will be in aid of the Montreal Soldiers' Wives League. The date will be April 5 to 12.

Columbus, O., Show.

The show at Columbus, O., will be held the week beginning March 3 and in the Memorial building. It will be known as the "Victory Show" and will probably include tractors in addition to passenger cars and trucks. The organization is directed by a committee consisting of A. B. Coates, I. P. Madden and H. K. Dobson, and the show will be managed by W. W. Freeman.

The following dates have been determined (save as indicated) for the exhibitions specified, of which greater detail is not available:

Los Angeles, Cal., Automotive Exposition, Los Angeles Motor Car Dealers' Association, Jan. 11-18.

Milwaukee, Wis., 11th annual exhibition of the Milwaukee Automobile Dealers, Inc., Auditorium, Bart J. Ruddle, manager, Jan. 24-30.

Rochester, N. Y., Rochester Auto Trade Association, George C. Donahue, manager, Feb. 10-15.

Albany, N. Y., Albany Automobile Dealers' Association, Armory, Feb. 15-22.

Louisville, Ky., Louisville Auto Dealers' Association, Feb. 15-22.

Newark, N. J., New Jersey Auto Exhibition Co., Claude Holgate, manager, Feb. 15-22.

Minneapolis, Northwestern Automotive Exposition, Overland building, Walter B. Wilmot, manager, Feb. 15-22.

South Bethlehem, Pa., Lehigh Valley Auto Shows Co., J. J. Elliott, manager, passenger cars, Feb. 17-24; trucks, Feb. 24-27.

Kansas City, Mo., Kansas City Motor Dealers' Association, E. E. Peake, manager, Feb. 24-March 1.

Springfield, Mass., Springfield Automobile Dealers' Association, Municipal Auditorium, Feb. 24-March 1.

Grand Rapids, Mich., Grand Rapids Automobile Business Association, E. T. Conlon, manager, February, date not determined.

Philadelphia, Pa., Philadelphia Automobile Trade Association, A. E. Maltby, manager, passenger car show followed by truck show, March, date not determined.

Buffalo, N. Y., Buffalo Automobile Dealers' Association, March 3-8.

San Francisco, Cal., Motor Car Dealers' Association, G. A. Wahlgreen, manager, March 1-10.

Syracuse, N. Y., Syracuse Automobile Dealers' Association, Harry T. Gardner, manager, March 10-15.

St. Josephs, Ia., St. Josephs Motor Car Dealers' Association, March 12-19.

Brooklyn, N. Y., Brooklyn Motor Vehicle Dealers' Association, I. C. Kirkham, manager; passenger cars, March 22-29; trucks, April 1-5.

Trenton, N. J., Trenton Auto Trade Association, John L. Brock, manager, March 17-22.

Great Falls, Mont., Montana Automobile Distributors' Association, March, date not determined.

Pittsburgh, Pa., Automobile Dealers' Association of Pittsburgh, John J. Bell, manager, March, date not determined.

Utica, N. Y., Utica Motor Dealers' Association, W. W. Garrabrant, manager, March, date not determined.

Harrisburg, Pa., Harrisburg Motor Dealers' Association, J. Clyde Myton, manager, date not determined.

Cleveland, O., Cleveland Auto Show Co., Fred H. Caley, manager, March or April, date not determined.

Bridgeport, Conn., City Battalion, B. B Steiber, manager, date not determined.

Hartford, Conn., Hartford Automobile Dealers' Association, date not determined.

Wilmington, Del., Wilmington Motor Trade Association, date not mentioned.

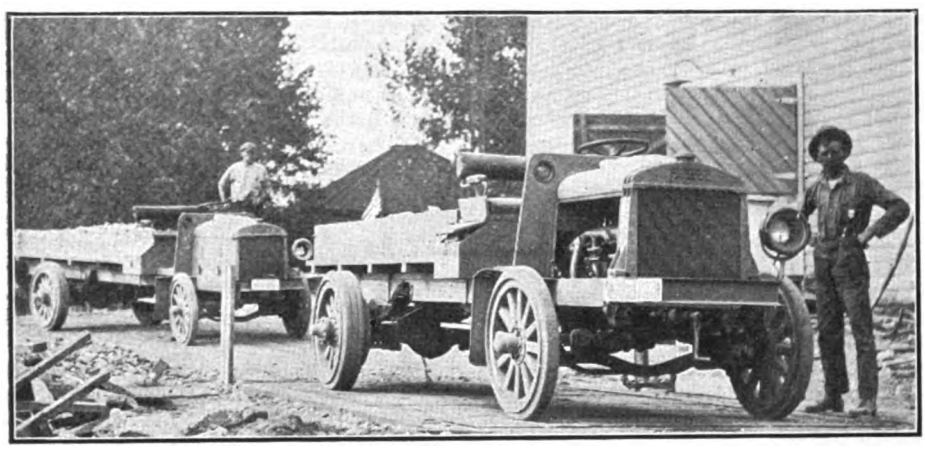
Little Rock, Ark., Little Rock Automobile Dealers' Association, April, date not determined.

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TRUCKS SAVED STEEL INDUSTRY

More Than 7000 Tons of Chrome Ore, Needed for War Work, Hauled 68 Miles on Mountain Trail, from Mines in Siskiyou County, Cal., to Railroad.

By James G. Stafford.



The First of the Fleet of Fageol Trucks Used for Hauling Chrome Ore to Meet the Government's Requirements for War Work, Reaching the Railroad Station at Hornbrook, Cal.

HAULING 7000 tons of chrome ore a distance of 65 miles from the Seiad Valley mines in Siskiyou county, California, to the railroad at Hornbrook, near the California-Oregon boundary line before winter snow blocked the roads was the work demanded by the government of contractors operating a fleet of 24 2½-ton Fageol trucks. Chrome ore is an essential of immediate need in the production of high grade steel for arms, ammunition, aviation engines and other high quality machinery.

The fleet of Fageol trucks, under the direction of contractors Benjamin H. Maddox & Co. of San Francisco, and H. W. Rohl of Sacramento, has been operated in this work from the mines in Siskiyou county to Hornbrook on the main line of the Southern Pacific railroad. The contract was undertaken about the middle of August and a large part of the work was done when hostilities ceased and the urgent demand was much decreased.

Before the beginning of the European war chrome ore was brought into the United States from foreign countries as ballast for vessels at a comparatively small freight rate. It reached the eastern smelting centers at a low cost because of short rail hauls. Because of the tremendous demand for "bottoms," this manner of shipping was discontinued, but the need for chrome led to the development of chrome ore mining in deposits in different parts of the country.

The United States used 150,000 tons of chrome ore last year. Domestic mining operations had acquired sufficient headway to produce only 48,000 tons of this total. There are, however, chrome ore deposits in the United States from which the entire demand for this mineral may be supplied. Probably two-thirds of the chrome ore needed this year will be mined in the United States.

California Has Chief Supply.

As in many instances, California is the source from which the greater part of this very necessary metal is obtained. Three-fourths of the entire production of chrome ore needed for the government purposes will come from California and Southern Oregon, and of this Pacific coast production about 90 per cent. will come from Siskiyou county, California, in which the Seiad Valley properties are located. All of the ore taken out has been transported over a 65-mile road of the very roughest sort by this fleet of 24 Fageol 2½-ton trucks.

There are three important mines in the Seiad Valley district. Two of them are operated by J. F. Reddy of Medford, Ore., which are generally known as the "Black Beauty Mines" in the Seiad Valley, and the "Lucky Boy" mines out of Hamburg. The other mine of important capacity in the Seiad district is operated by Samuel H. Dolbear.

Chrome ore is ordinarily found in small pockets. A deposit that would produce more than 2000 or 3000 tons of high grade ore is quite unusual, although there are in this Siskiyou county mineral belt deposits that already have produced more than this tonnage and are apparently still far from being exhausted.

Chrome ore deposits are invariably located high up in the mountains. The ore is mined by hand. Mining operations are comparatively simple—more in the nature of quarrying than the customary gold mining operations. The ore is piled on the dumps at the mine and is either trammed or sledded down the steepest places to bunkers or loading platforms, from which the trucks receive it. The higher the grade of ore the greater its weight.

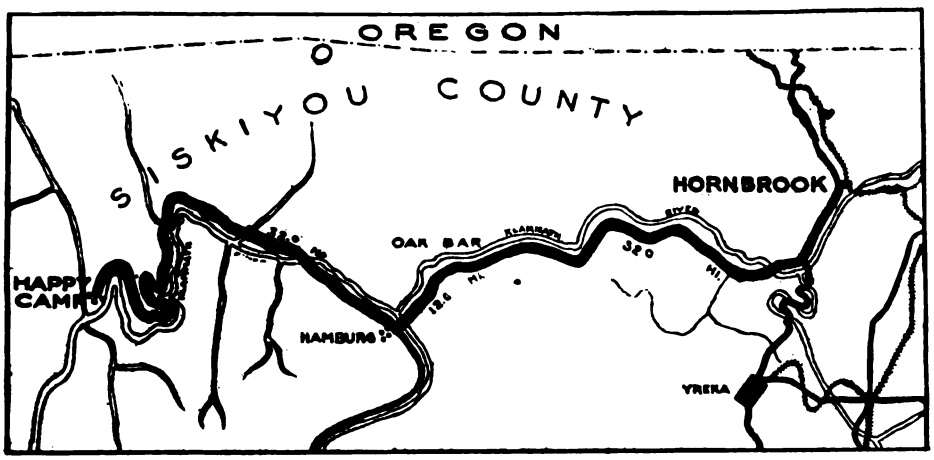
Transportation a Vital Need.

The most vital need in the production of chrome ore at present is transportation, because practically every important chrome ore deposit in the United States is far removed from railroad lines. As indicated the mining operations are relatively simple, and also that the Seiad district properties have deposits of great magnitude, but the ore is of comparatively no value unless it can be transported to a railroad and shipped East to the smelters. Furthermore, chrome ore is essentially important in the war program, since it plays such an important part in the production of ammunition and guns. When peace is declared chrome ore de-



Unloading the Chrome Ore, Almost Priceless Because of the Need of Special Steel for War Munitions, at the Hornbrook Station.

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Map Showing the Mountain Road Through the Klammath River Canyon, on Which the Chrome Ore Was Hauled from the Mines, 68 Miles from the Railroad.

posits located 65 miles from a railroad will probably remain undisturbed for many, many years; thus the need of the government was dependent entirely on transportation—and relatively quick transportation—from the mines to Hornbrook, the main line of the Southern Pacific railroad.

Several attempts had been made by other contractors operating motor trucks to transport the chrome from the mines. It meant hauling a minimum tonnage of ore per day at a cost that would not be prohibitive to miners, and would show fair profit to the contractors. Apparently the reason for failure on the part of other contractors was the lack of an organization for operating the trucks between the mines and railroads. Benjamin H. Maddox, who owned 15 heavy duty motor trucks before he took this chrome ore hauling contract, is one of the best known trucking contractors in California. His success is largely due to the careful plan for handling the work, and operating to this system under his personal supervision with capable truck drivers, dispatchers and mechanics.

Mountain Haulage Increased Work.

The transportation of 7000 tons of chrome ore in a period of approximately 100 working days 65 miles over a mountain road means that these trucks will have to their credit 455,000 ton-miles before they will complete the contract. It meant also that it was necessary to haul 75 tons a day to get the full tonnage out before snow blocked the road.

So far as known there was no other trucking operation in the United States of this character or of this magnitude when this contract was undertaken. It is believed that the 24 Fageol trucks worked on this contract is the largest fleet of the same make and of 2½-ton capacity units hauling ore at any place in this country, which probably means in the world. Aside from the transportation contracted for by the government it is believed to be one of the largest trucking operation ever undertaken in the United States.

The conditions for operating trucks were very poor for the road follows the canyon of the Klammath river. It is an old post road from Hornbrook to the coast, and was originally an Indian trail. According to statements it is not much more than a trail now. It is narrow, practically its entire distance, except the upper eight miles leading into Hornbrook station, which is a section of the Pacific highway to Portland. As an indication of the condition of the road it takes five to seven hours for a passenger car to cover the distance of 65 miles.

Road Through River Canyon.

The river road has been used by wagons and automobiles for many years and there are well defined ruts quite close together as a result. The rear wheels of the trucks, being broader than the ruts, are forced to ride on the sides of the tires. Very serious tire wear and greatly increased expenses of operation are a consequence. The ordinary solid tire can be driven about 15 round trips, or 1000 miles, before it is so worn it must be replaced. With trucks formerly used by other contractors on this haul no such tire mileage was obtained by them.

The value of the easy riding qualities of the Fageol 2½ tonners with capacity loads of ore is well established by this very satisfactory tire mileage. This is claimed to be the result of the patented spring oiling system, which feeds lubricant automatically from reservoirs in the spring hangers by wick and capillary attraction, and insures the springs having the highest degree of flexibility. This, of course, means that the load rides more easily, and the road shocks are absorbed by the springs rather than being transmitted through the wheels to the frame and motor mechanism. The trucks are maintained to handle more easily on the narrow roads and are operated at considerably less expense than other makes.

The contractors get approximately $75 freightage per round trip of 130 miles. The trucks are operated day and night and one truck makes three round trips in two days. This, of course, is accomplished by the continual driving with relays of drivers.

Operating Plan Carefully Made.

The operating plan with which Contractors Maddox and Rohl have made a success of the work was carefully developed. A camp was established at Oak Bar, a little settlement about midway between the mining district and Hornbrook. Trucks are operated in trains of five to 10, and the dispatching is so timed that one section leaves Oak Bar camp for the mine as the other leaves for Hornbrook. No truck driver is permitted to operate a truck for more than eight hours. This is because of the extreme danger of the narrow river canyon road. There is but a narrow shoulder between the wheel tracks in the roadway and the almost perpendicular bank of the river. An instant's inattention would possibly result in a plunge into the water below. A drowsy or careless driver could cause much loss of property and perhaps life, so one of the rigid requirements by Maddox and Rohl relates to truck control and attention. The drivers must give their attention to driving at all times and for the entire distance. If such attention is given there is no reason for a truck leaving the road.

System in trucking operations must deal with handling the drivers and mechanical care of the trucks. Both Mr. Maddox and Mr. Rohl have made careful provision to insure complete supervision. At Oak Bar Camp there are in addition to the 50 truck drivers employed, the camp boss, who is in charge of all mechanical work and truck inspection, and a train boss for each group of trucks on the road.

Careful Truck Inspection.

Before being sent out with a load each truck is given a careful inspection. The



One of the Incidents of Ore Haulage—Freighted Truck Off the Runway at the Hornbrook Station Loading Dump—A Minor Mishap When Contrasted with the Constant Danger of the Main Road.

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drivers are allowed one hour a day for doing whatever general work may be necessary on each truck. As nearly as possible the drivers work in relay teams, each operating one particular truck. A bonus system, in addition to the regular wage is paid, and it is possible for the drivers to make as much as $1 a day extra by bringing their trucks into camp on schedule time and in good condition.

When actual mechanical repairs are necessary or the tires must be replaced, etc., such work is taken care of by the mechanics, who form an important part of the contractors' organizations. Each truck is inspected by the camp foreman before time for leaving and if it is not in good condition it is not sent out. The driver is then required to put it into good operating condition on his own time. Most of the drivers are efficient, capable men and take pride in maintaining their trucks to a high mechanical standard.

The round trip requires 16 hours and it is usual practise to make three round trips in two days. The haul is up grade from the Seiad Valley mines to Hornbrook and requires eight hours from the Oak Bar Camp to the mine and return with a load, and eight hours from the camp to Hornbrook, returning to camp empty. When it is possible the trucks are given a return haul of supplies, important mine machinery and other equipment. Drivers are glad to get such a load as it makes the trucks ride much easier over the rough road.

Trucks Carry Excess Loads.

The ore hauling bodies on the trucks are four feet wide, 12 feet long and 14 inches deep. The full load of chrome weighs from 2½ to four tons and because of the character of the road the trucks must necessarily be driven at a low rate of speed. It has been deemed advisable by Contractors Maddox and Rohl to operate their Fageol trucks on this haul with a load of more than the factory rated capacity, and they carry three tons of chrome ore in addition to the bodies on the 2½-ton chassis.

While none of the grades on the road are prohibitive, although there are many sharp pitches for distance of 200 or 300 yards. These are stiff grades and are very rough, rutted and try the truck's power to the utmost. Passing is extremely difficult because of the narrow road. Loaded trucks have the right of way and frequently a truck driver must back for the distance of a half mile or more to let a load of chrome pass him.

At present the government has 40 men working on this road to make it suitable for winter hauling, and it is understood that an appropriation of $15,000 has been made to improve the road. This improvement is an undertaking of unusual proportions, as the road is cut into the banks of the Klammath river, which in a great many instances are practically perpendicular both above and below the road.

Canadian Soldiers Trained to Farm Tractor Work.

Because of its longer experience with results of the war and the realization that upon their return from the battlefields of Europe reasonably lucrative occupations must be found for its soldiers, the Canadian government a considerable time ago undertook to train men who were physically incapacitated from resuming their former work. The government had no definite knowledge of the number of citizens who might be in need of assistance in finding employment. Obviously many thousand men would return who might consistently make demand upon the state for partial support, who would be unable to earn the same wages because of disabilities, and who were entitled to consideration.

The practicality of a plan of training these men to new work, which would make them wholly or partly self-sustaining was indorsed, and this resulted in the establishment in several places of what are known as vocational re-education schools, where the soldiers are systematically trained for such work as they can best do, according to their physical condition. One of these schools is at Toronto, Ont., and with the belief that many men will avail themselves of grants of farms, one department is devoted to teaching all soldiers who may desire to engage in farming whatever will be for their advantage to learn.

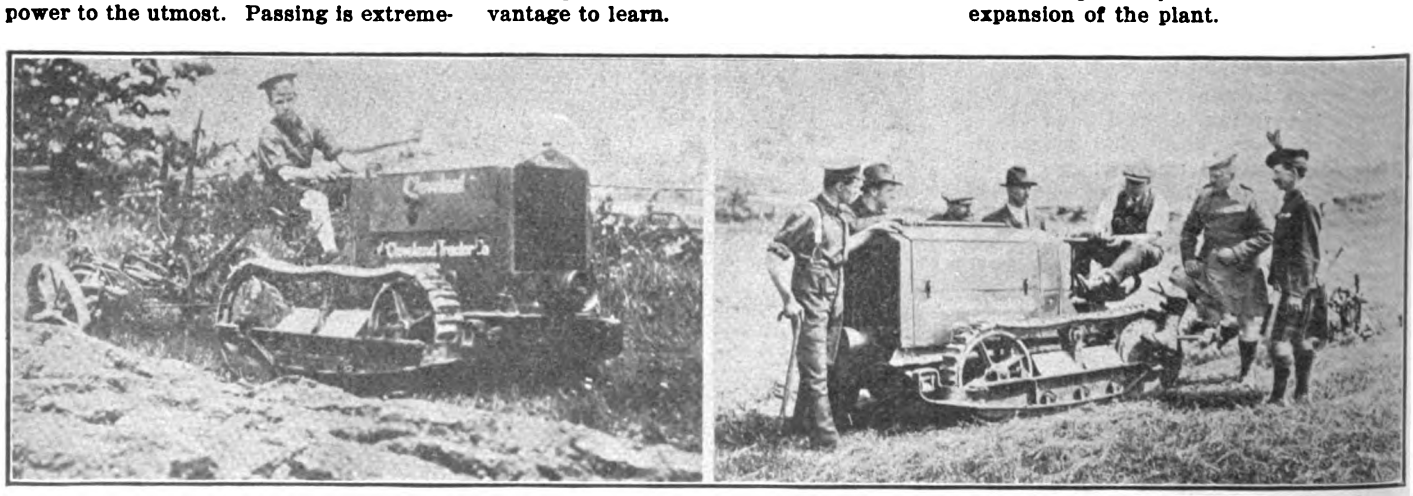
At the Toronto school the department given over to training agricultural workers has been equipped with farm tractors and various machines and power implements, and the soldiers are taught to understand them mechanically, to drive, adjust and repair them, and are given comprehensive courses in theory as well as practical work. This tuition is intended to fit these men to earn good wages, to place them where they can be as independent as is possible for rehabilitated men to be, and to so qualify them that their services will be in demand.

Men who have suffered the loss of a leg, an arm, or an eye, or are otherwise crippled, are trained so that they can, by their own exertions, be beyond want, for there is dependence in the loyalty of Canadian farmers to employ these men so far as is possible. The men with rare exceptions become remarkably proficient, even when using artificial limbs.

The tractors and other machines are adapted so that they can be handled to full productiveness, and there is reason to believe that thousands of men who have suffered physical loss will be able to maintain themselves independently through the training afforded by these schools. And very largely the knowledge of tractors will be the mainstay of these men through life. Incidentally, the schools are equipped with American machines and the knowledge these men possess will undoubtedly create a still greater demand for tractors built in the United States in Canada.

ARMY TRACTOR ADDITION TO FORD PLANT AN ASSET.

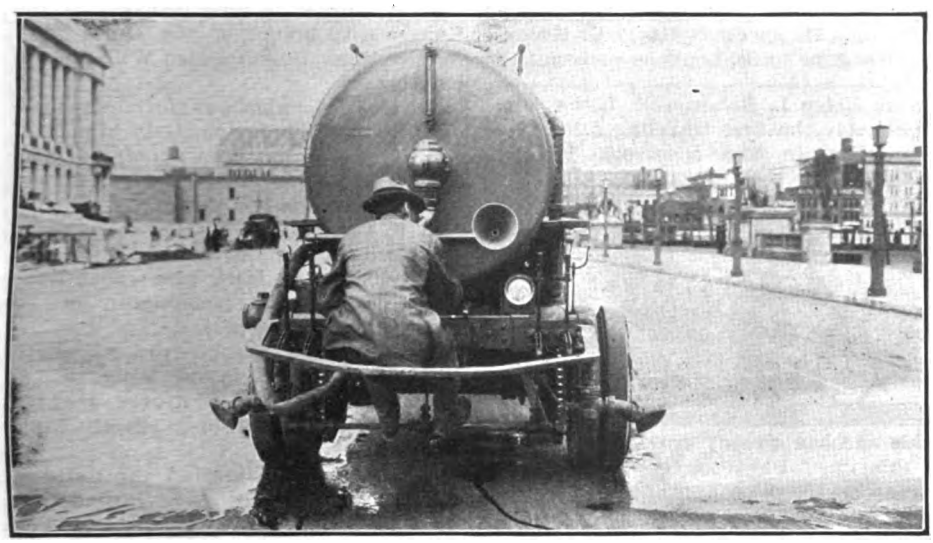
Though the War Department cancelled a very large contract made with Henry Ford & Son, Dearborn, Mich., for the production of tractors for the use of the United States army, there is a nearly completed addition to the works that will no doubt be turned to good account. The contract was of such proportions that a structure having 180,000 square feet of floor area was contracted for and the work on this had well advanced when the contract was cancelled. The addition was to cost $1,000,000. The building was designed especially for tractor production and will probably be utilized in future expansion of the plant.



Canadian Veteran Soldiers, Physically Unfitted for Former Occupations, Training at the Vocational Re-Educational School at Toronto, Ont., to Drive Tractors—The Man Who Is Shown at the Left Has an Artificial Leg, but Is Extremely Efficient Despite This.

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Motor Apparatus for Street Cleaning Operations



Rear View of Flusher Used by the Street Cleaning Department of San Francisco, Showing the Steel Guard Installed to Protect the Operator of the Flushing Control.

Municipalities the nation over have accepted generally the utility of power driven apparatus for varying departmental work, and while many manufacturers produce machines designed for what may be termed standard service, numerous municipal administrative bodies have approved the ideas of departmental heads and permitted them to add to standard equipment fittings that are based on knowledge of conditions and seemingly have much to recommend them. By this is meant that practical men have good ideas relative to their own work, and these may be adapted to machines of all types in similar service, although the adaptations may differ somewhat.

The street cleaning department of the department of public works of San Francisco, Cal., uses several power driven tank flushers of a type that require crews of two men, one to drive and the other to operate the flusher control at the rear end of the machines. The separate control was preferred because there was belief that in heavy traffic the driver could not do the flushing as satisfactorily with a machine that diverted his attention from driving to avoiding vehicles and pedestrians.

These apparatuses have seats at the rear, where the valves are regulated by the operators, but very brief experience established that there was constant danger for them, for reckless drivers frequently approached too closely and had no thought of the possibility of injury to the men at the rear of the tanks. To protect the operators heavy steel guards were attached to the main frames of the chassis, sufficiently removed from the seats to safeguard the men in the event of collision, whether approach is from the side or the rear.

The efficiency of the department has been greatly increased by the use of flushers, for these machines can flush from 15 to 20 miles of paved street a day, or at least 100 miles a week. The work is exceedingly well done. The flushers are worked with Eductor cesspool cleaners, which are used for removing the contents of cesspools and sewer catch basins, this being done so far as is possible by pumpage. In one of the two accompanying illustrations an Eductor cleaner is shown with the crew cleaning a sewer pocket, and the other shows the rear end of a flusher with the guard protecting the operator controlling the valves.

Frank A. Sharpe has been appointed district manager for the Thermoid Rubber Co., Trenton, N. J. His headquarters will be in the Kresge building, Detroit.

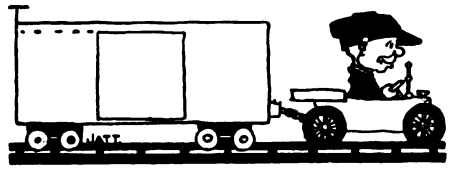
R. S. McLaughlin has been elected a director and member of the executive committee of the General Motors Corporation. He is president of the McLaughlin Motor Car Co., Ltd., Toronto.

J. P. Adams, at the annual meeting of the Peterson-Culp Gearless Steam Auto Co., was re-elected president. L. Leitner was elected secretary and treasurer. He was formerly consulting engineer for the company. The company plans to build a factory in Denver and to produce both passenger cars and trucks.

H. L. Dunn is now located at Moline, Ill., where he is associated with the Moline Plow Co., recently acquired by John N. Willys. He was formerly assistant purchasing agent of the Willys-Overland Co., Toledo.

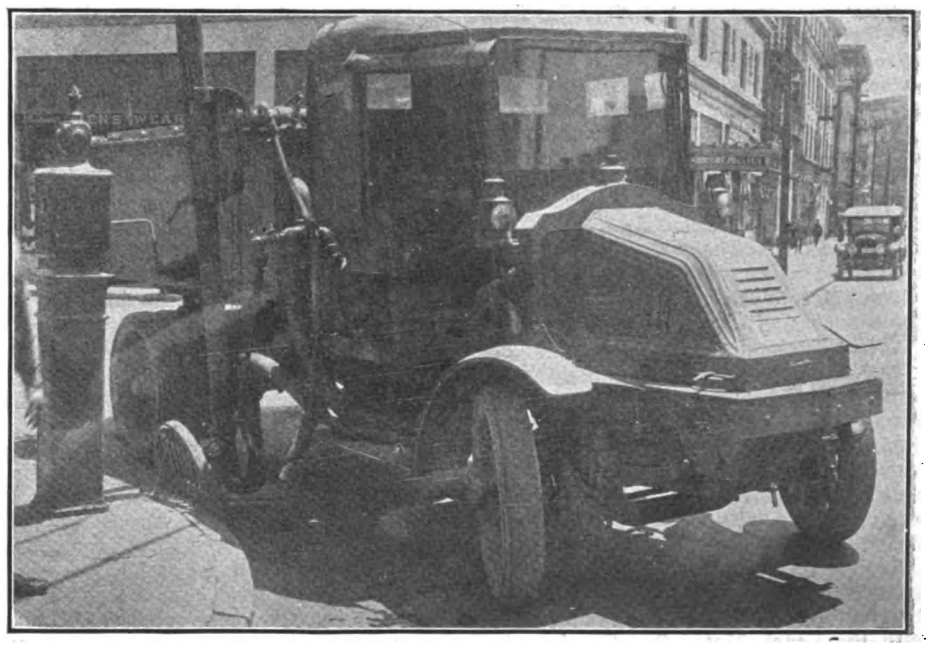
Capt. Charles E. Speaks, at present in France, has been promoted to be a major in the Quartermaster Department. Before entering the army he was manager of truck tire sales for the Firestone Tire and Rubber Co., Akron, O.

A dealer in Providence, R. I., who had been seriously inconvenienced in his business through lack of switching facilities in the railroad yard there, decided that he would try one of his old Dodge cars as a substitute for a locomotive in moving the freight cars about. The car had



seen more than 20,000 miles of service, yet it moved the 50,000 pound freight cars about with comparative ease, "kicking" them up to the platform where they could be unloaded.

R. J. Miller, formerly connected with the Studebaker Corporation, has been appointed district sales manager for New England for the Cleveland Tractor Co. to succeed H. S. Ketcham, who recently resigned that position. Mr. Miller's headquarters are in Boston with A. H. Sowers, who is agent for Eastern Massachusetts for Cleveland tractors.



Eductor Equipment on a Kelly-Springfield Chassis, Used with the Flushers, for Cleaning Cesspools and Sewer Catch Basins by the San Francisco Street Cleaning Department.

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Personal Mention of Men That You Know

Lee Pierce is now city sales manager for the southwest for Nash Motors Co., St. Louis, Mo.

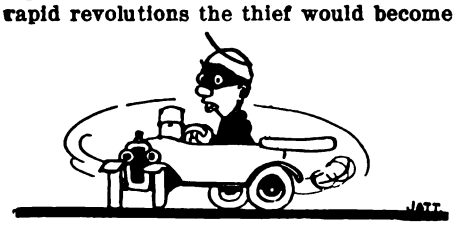
J. J. Friede has been appointed manager of the Bearings Service Co.'s branch at St. Louis, Mo. He was formerly assistant manager. This is the second change made in the management of the branch because of enlistments.

J. J. Gannon is now in charge of the Swinehart branch of Kansas City. He was formerly of Chicago.

Albert Gough, who was formerly connected with the Shaw Electric Crane Co., Muskegon, Mich., is now in charge of the service department of the Liberty Motor Car Co.

George W. Browne has been elected one of the 50 manufacturers, merchants, business and professional men of Milwaukee who will serve as a member of the "reconstruction council" of that city. The council is composed of representatives of the principal lines of industry. The purpose of the council is to facilitate the readjustment which must follow war, to the end that neither employers and employees suffer unduly. Mr. Browne is one of the leading motor car distributors and dealers in the United States and is distributor for the Willys-Knight and Overland in Wisconsin.

The latest thing in anti-thief locks for automobiles is a device that locks the steering gear in a cramped position so that if the car is operated it can only turn in a circle. It was probably the design of the inventor that after several rapid revolutions the thief would become



so dizzy he would fall from the car and be readily captured or else that he would become disgusted upon discovering that he returned to the starting point each time and would abandon the machine where he first entered it. No great demand for this device has been reported as yet.

Thomas O'Brien has assumed the duties of district sales manager for the Bethlehem Motors Corporation, Allentown. His territory will be New York state and the New England states.

Jack Finney has received a commission in the United States army as captain and is now in charge of the motor repair station at Fort Jessup, Atlanta, Ga. He was formerly branch manager for the Maxwell Motor Co., Richmond, Va., and later was connected with the Linger-Alsop Co., Maxwell and Chalmer distributor.

George W. Franklin, who was formerly of the George W. Franklin Co., Detroit, distributor of Dort cars, is now connected with the Leach Motor Car Co., Los Angeles, distributor of Dort, Mitchell and Premier machines.

Harrison Goldsmith has been made secretary and business manager of the Rocky Mountain Automobile Trades Association. He succeeds Harry G. Moock, who has gone to St. Louis as assistant to President Vesper of the National Automobile Dealers' Association. Mr. Goldsmith has also been appointed secretary of the Automobile Trades Bureau of the Denver Civic and Commercial Association. He was formerly assistant manager of the Miller-Ray Motor Co., Kissel distributor for Colorado.

Miss Helen L. Roberts, St. Louis, Mo., is probably the first traveling sales representative in the accessory jobbing



trade and has already proven her ability in this line. She took the place made vacant on the sales force of a large dealer in St. Louis when a salesman joined the colors for service overseas, and immediately displayed exceptional sales ability.

C. L. Loveland succeeds D. J. T. Kennedy as advertising manager of the Mason Tire and Rubber Co., Kent, O. Before entering the tire industry Mr. Loveland was advertising manager of the Waterloo Cement Machinery Corporation.

A. W. Dietzel, who for several years was superintendent of the Waukesha Motor Co., Waukesha, Wis., has retired to become works manager for the I. B. Rowell Co., Waukesha. This concern is engaged in the manufacture of farm implements, tractor parts and starters for Ford chassis.

R. C. Kimball is in charge of the office established in the David Whitney building, Detroit, by the Lakewood Engineering Co. of Cleveland, O., as factory transportation expert.

W. L. Romaine has been appointed a director of the division of oil conservation of the fuel administrator for Wisconsin, this being a new office created for the purpose of administration of regulations and rules having to do with the uses of fuel, lubricating and other oils, as well as gasoline and all petroleum products. Mr. Romaine is secretary of the Badger-Packard Machinery Co., Milwaukee, Wis.

Howard Emery is now manager of the Detroit plant of the Aluminum Casting Co., taking the position of Charles B. Bohm, who has retired. Mr. Emery was formerly manager of the company's works at Manitowoc.

L. A. Smith now has charge of the Maxwell and Chalmers sales in the eastern territory, with headquarters in New York. He was formerly assistant to T. J. Toner, director of sales and advertising of the Maxwell Motor Co., Inc., Detroit.

J. R. Turner is now manager of the Kansas City branch of the Quick Tire Service, Inc. He succeeded W. R. Chamberlain.

Louis Klee, who was formerly manager of the Wilmington, Del., branch of the White Co., has been appointed man aging secretary of the highway transportation committee of Delaware.

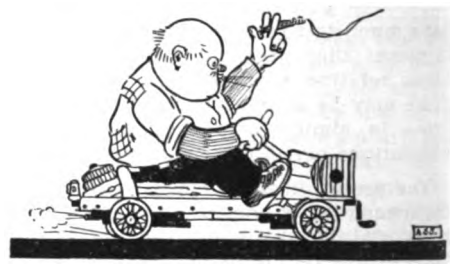
L. F. Collins is now sales manager of the Nash Motors Co., Kansas City, Mo., succeeding H. C. Hart, who recently received a captain's commission in the Ordnance Department.

Dwight Davis has become associated with the Evertight Piston Ring Co., St. Louis, Mo. He was formerly assistant general manager of the Hyatt Roller Bearing Co.

J. E. Baum has assumed the duties of service manager of the Philadelphia Nash Motors Co. He was formerly connected with the factory service department of the company.

In these days of high gasoline prices and high prices for everything, including automobiles, why not make your own car. It's not such a tough job, Bill Powell of Chicago, Jll., says, and he has a "self-made" car to back his statement that any man with two hands and a head can turn out a "bus" that makes up in efficiency what it lacks in size.

Bill wrote to the Remy Electric Co. of



Detroit and Anderson, Ind., about his baby motor car a few days ago, saying that he has used a motorcycle engine and a Remy generator for ignition and lighting.

The power plant is a two-cylinder, 11 horsepower engine, and the wire wheels are fitted with airplane tires, which Bill says "make it pretty soft." As the car is extremely light, Powell avers that "the gasoline consumption is unusually low."

J. P. Guyer is now manager of the branch of the Packard Motor Car Co. at Bethlehem, Pa. He succeeds J. E. Huggins, who has resigned.

J. K. Gilchrist, who has been acting as southwestern representative for Edward A. Cassidy Co., with headquarters at Dallas, Tex., will become associated with C. L. Dupuy, southwestern division sales manager of the Selden Truck Sales Co. of Rochester, N. Y. For the time being Mr. Gilchrist will be located at Dallas, Tex., in charge of sales for the Texas Truck Co., Selden distributors in the State of Texas.

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L. F. Schoellkopf has been re-elected president of the Madison Association of Commerce. He is head of the Schoellkopf Co., Ford dealer, Madison, Wis.

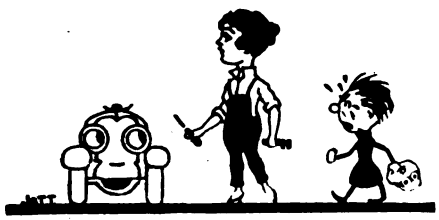
H. H. Shuart is now associated with the executive staff of the Denby Motor Truck Co., Detroit. He was formerly manager of the Detroit Automobile Dealers' Association.

Frederick J. Sickert, Jr., has received a commission as first lieutenant in the Motor Transport Corps at Camp Holabird, Md. He was formerly president and manager of the F. J. Siekert Co., Milwaukee, dealer in motor trucks.

A. W. Dietzel has resigned as superintendent of the Waukesha Motor Co., Waukesha, Wis., to accept the position of works manager of the L. B. Rowell Co., Waukesha, manufacturer of Ford starters, tractor parts and farm implements.

R. J. Miller, formerly with the Studebaker, is now in New England to take charge of the work of aiding the dealers selling Cleveland tractors. His headquarters is with A. H. Sowers, the eastern Massachusetts agent at Boston.

A real 1918 edition of the modern business woman holding forth in a business establishment on Massachusetts avenue, Boston, is an expert scientist on motor car carburetors. Hundreds of times a day this girl is called upon to test carburetors, direct their repair and explain the mysteries of this complicated accessory to car buyers and operators. The firm is well pleased, for when an angry customer dashes into the trouble room burning with a lot of fiery language which he would like to unburden, he is com-



pelled to desist from the motives of chivalry and soon depart with a smile with the trouble entirely adjusted.

John F. Shuford has resigned as manager of the wholesale department of the Bittel-Leftwich Co., and has started a place for himself as "supply exchange." He is also a distributor for the eastern half of Missouri for the Disco starter for Fords and is jobbing a tire repair material that is made after a private formula.

C. L. Hodgson, formerly manager of the Omaha branch of the Bearing Service Co., has been appointed central district manager of the Chicago branch. T. L. Hutchinson succeeds Mr. Hodgson in Omaha. He was formerly a special representative.

A. E. Schaefer has become sales manager of the Gramm-Bernstein Motor Truck Co., Lima, O. He was at one time associated with the Sherwin-Williams Paint Co. and later served as manager of the Abbott Motor Co.

E. L. Evans, formerly chief inspector of the plant of the Oil-Less Bearing Co., Bound Brook, N. J., has been appointed superintendent of plant No. 1.

S. E. Cole is now manager of the Omaha branch of the H. W. Johns-Manville Co, succeeding Charles W. Simms, the former manager. Mr. Cole has had experience in various fields.

James A. Bennett has been appointed purchasing agent of the Connecticut Telephone and Electric Co. of Meriden, Conn. He was formerly connected with the sales department of the company.

No matter what Winter does to the general landscape the motorist takes advantage of it. When the New Year was ushered in by an Arctic transformation the Hudson river became a tempting ice



bound level. This condition brought about a new sport—fishing from an automobile. Fishermen and bird shooters had several glorious days pursuing their prey up and down the frozen river.

C. W. Stephens has become associated with the Detroit Twist Drill Co. as manager of sales. He succeeds Nelson J. Smith, who is now assistant to President Muir B. Snow.

A. E. Walden has resigned as experimental engineer of the Chalmers Motor Co., Detroit, to take charge of an experimental station at Indianapolis under Capt. D. M. Lasley. He has been with the Chalmers company for seven years.

O. C. Bornholt has been appointed mechanical engineer of the Buick Motor Co., Flint, Mich. Mr. Bornholt was formerly factory manager of the Holley Kerosene Carburetor Co., Detroit.

E. V. Rippingille has returned to his duties as assistant sales manager of the Hudson Motor Car Co., Detroit. When United States entered the war Mr. Rippingille went to Washington, where he was engaged in special work for the government.

R. R. Cook is now assistant sales manager of the Lalley Electro Lighting Corporation. He was one of the field organizers of the company. Previous to this connection he was sales manager of the Cadillac Motor Car Co.

W. T. Norton, Jr., has returned from special work in France in connection with motor transportation. He was formerly chief engineer of the manufacturing division of the Selden Truck Sales Co. Mr. Norton has now been assigned to the executive branch, Engineering Division, Motor Transport Corps, at Washington. Mr. Norton was succeeded as chief engineer of the Selden company by John R. Coleman, but remains with the company as consulting engineer.

E. T. Sutton, formerly district manager of the Denby Motor Truck Co., has been transferred to Cleveland and will travel in Ohio, Kentucky, West Virginia and parts of Pennsylvania and Virginia. His headquarters are with the Ohio Oldsmobile Co.

A. J. Brechtel has succeeded Earl R. Carpenter as manager of the Kansas City, Mo., branch of the Studebaker Co. Mr. Brechtel was formerly at the factory. Mr. Carpenter is now manager of the Los Angeles Studebaker branch.

B. T. McDonald, Jr., is now superintendent of the Moline Plow Co. to succeed J. L. Irving, who becomes vice president and general manager. Mr. McDonald was formerly with the Poughkeepsie and Stoughton branches and also founded the McDonald Pitless Scale Co., which was absorbed by the Moline company eight years ago.

Richard A. Watson has resigned as secretary and production manager of the American Bronze Corporation, Berwyn, Pa. He still remains as a member of the board of directors.

Martin V. Kelley, president of the Martin V. Kelley Co. of Toledo, O., is also an author of a book entitled "Theme Advertising Co." Mr. Kelley outlines a new scheme for getting greater results.

E. L. Allis has been appointed general manager of the Boston branch of the Motor Car Equipment Co., New York. He was formerly in charge of sales of that branch. Harry Watkins will be Mr. Allis' assistant.

Some car thief who does not respect honest toil had the innate meanness a few nights ago to steal the automobile



belonging to a washer woman in Arlington, Mass. The car was later recovered by the roadside where the thief had left it after using up all the gasoline. The publicity arising from the incident was the first revelation to the world that this really modern washer woman introduces into her work a motor car, with which all her work is called for and delivered, just like a modern machine laundry.

Kelly R. Jacoby and Edward H. Belden have been elected vice presidents of Willys-Overland. Mr. Jacoby, who is made vice president in charge of purchases, has had long experience. He had been general manager of the Miami Cycle and Manufacturing Co., Middletown, O. He first started as a director of service, afterward assistant to First Vice President C. A. Earl. Mr. Belden is in charge of engineering. He is the inventor of the gearset bearing which bears his name. He has been associated with the Packard organization as body engineer. About two years ago he joined the Willys-Overland and has been in charge of the engineering department.

Raymond Wice has been released from the Officers' Training School at Camp Pike, Ark., and is again with the Hudson-Phillips Motor Car Co. at St. Louis.

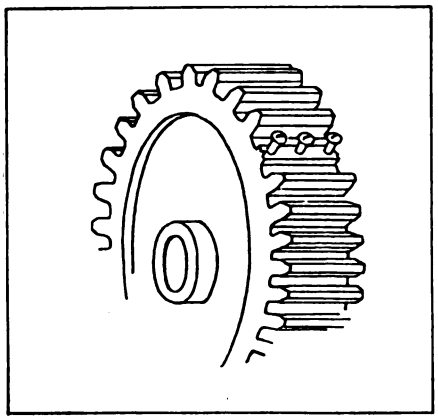
G. E. Golder has been appointed manager of the Garford branch in St. Louis. He was formerly assistant manager of the Garford branch in Chicago.

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Practical Kinks for Repairers

GEAR REPAIR.

Oftentimes the tooth of a spur gear on the air pump or an accessory is broken off through carelessness. Unless repaired a new gear is necessary before the pump can be used. When the gear is not subjected to very great strain the following method of tooth replacement is very practical. While it is not to be recommended for gears that are in constant use or in places where gear action is vital, it makes the replacement of an unimportant gear unnecessary. File the broken tooth off smooth with the rim and bore holes about ⅝ inches apart across the

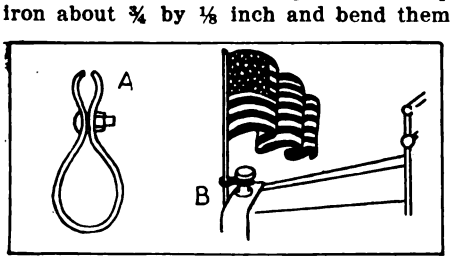


Temporary Gear Repair.

face of the gear. The size of the holes to be not greater than the width of the narrowest part of the tooth. After having tapped the holes insert round headed screws through the rim, upsetting the ends with a nail set or punch so that they will not loosen. Then file the heads to conform with the general shape of the teeth, trying it in place from time to time. Such a temporary repair can be made in a very short time and may be improved at a later date by filing a new tooth out of iron and screwing it in place in the same manner.

FLAG HOLDER.

"Be patriotic and show your colors on your automobile," is the general slogan of all Americans today. Anyone can make a flag holder for attaching a flag to the filler cap of the radiator at a very small cost. Get two short pieces of strap iron about ¾ by ⅛ inch and bend them

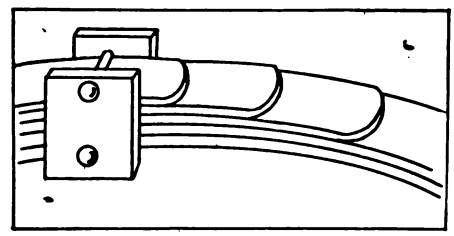


Flag Holder.

in the shape shown in the illustration. Drill a ¼ inch hole through them and insert a bolt. Remove the radiator filler cap, place the large bend over the filler and with the bolt in position clamp the flag and fitting into place as shown at B.

SPRING LUBRICATORS.

The life of car springs may be materially lengthened, the riding qualities of the car improved and many squeaks eliminated by keeping the springs well lubri-

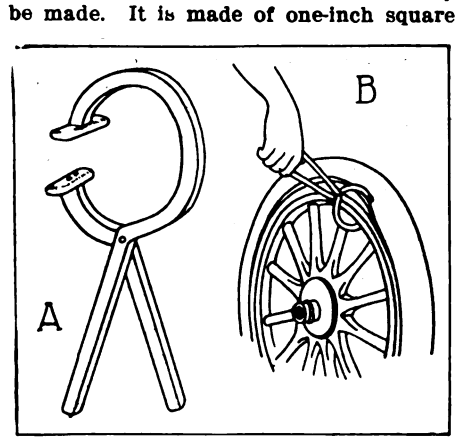


Spring Lubricator.

cated. Each spring should be kept oiled by using a device upon it as illustrated. With two bolts fasten a piece of brass or thin wood strip upon each side of the spring, placing a thin strip of felt between the device and the spring leaves. Apply a sufficient quantity of oil to the felt strip to saturate it and run the oil along the leaves where they contact. The felt forms a sort of reservoir and the oil is fed to the spring leaves in small quantities by capillary action.

CLINCHER TIRE REMOVER.

The majority of motorists experience difficulty when attempting to pry the clincher shoe away from the rim so that the tire tool can be inserted. There are several devices now on the market for facilitating the removal of this type of shoe, but if the motorist does not feel disposed to expend the necessary amount, a tool similar to the one shown can easily be made. It is made of one-inch square



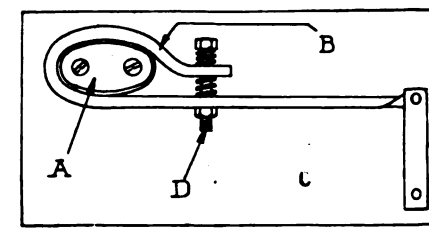
A Simple but Practical Clincher Tire Remover, and How It Can Be Used.

steel. The construction consists of two tong like extremities having handles, which, when brought together, overcomes the resistance of the shoe even when badly rusted to the rim. Be sure to round off all the sharp edges of the tool so that it will not cut into the shoe. The pieces which contact with the tires are attached with screws to the end of the jaws. The method of application to the tire is as shown.

SHOCK ABSORBER.

A subscriber residing in Rhode Island has made a shock absorber which he constructed very easily. A piece of cast iron of oval shape is bolted to the frame of the car (see "A."). Most any junk yard will furnish such a piece of iron, or it can be obtained from a foundry from a wooden pattern which is easily whittled out with a knife. Around this oval a heavy piece of iron is bent. One end of the iron is twisted at right angles and fastened to a shorter length of iron, "C," by a single bolt. The other end is looped over and a bolt passed through it, fastening it to itself, as at "D." A spring is placed between the end of the bolt and the iron and also between the end of the iron and the bar itself.

The free end of "C" is fastened by a single bolt to a clip on the axle. To give good service the iron should be about ⅜



Shock Absorber.

inch thick, 1½ inches wide. The oval should be about three by two inches. The distance between the outer edge of the oval and the center of "C" should be about eight inches.

When the car is at rest with no load the absorber should be in the position shown in the cut. As the body of the car drops the oval is slightly turned on its center, bringing a pressure with friction on the arm, which tends to pull the oval back to its normal position. The same thing happens when the car "jumps." The action of the shock absorber is controlled by the tension of the iron strap on the oval, which is adjustable at the bolt "D."

MILLING CUTTER LUBRICANT.

An excellent lubricant for milling cutters can be made by mixing together and boiling for about a half hour one-quarter pound sal soda, one-half pint lard oil, one-half pint soft soap and enough water to make 10 quarts.

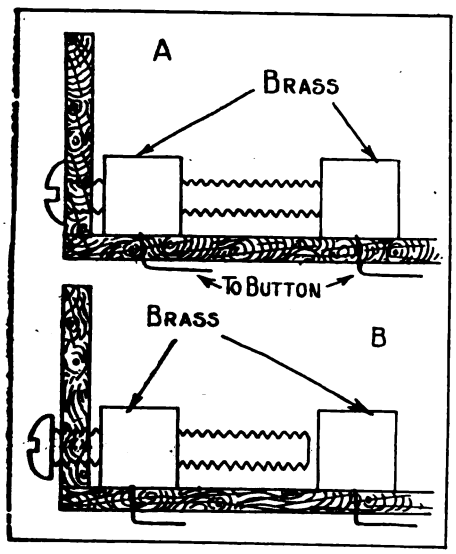
CLEANING THE HANDS.

A repair man in Massachusetts advises that the appearance of a mechanic's hands can be much improved by cleaning them in the following manner: Rub ordinary soap well into the pores of the skin and with the aid of a little gasoline, form a lather by rubbing the hands together. The hands can then be washed in the ordinary manner. A brush with stiff bristles will greatly aid the cleansing operation.

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THIEF WARNING.

There is an old saying that "Honesty is the best policy," another to the effect that there is honor even among thieves. It seems as though both of these time worn adages have been placed on the out of order list, as the number of automobile thefts are constantly growing. How to foil the auto thief is a big problem that is attracting much attention at this time. A novel device is used by one of our subscribers that certainly will cause the would-be thief considerable alarm and a big surprise if he should make an attempt to take the car away. At point where the wires to the electric horn on the Ford car pass through the dash board two very fine silk covered copper wires are soldered and insulated in such a manner that the splice is entirely concealed inside the wood wash. The fine wires are lead along the dash, beneath



Switch Arrangement for Foiling the Thief.

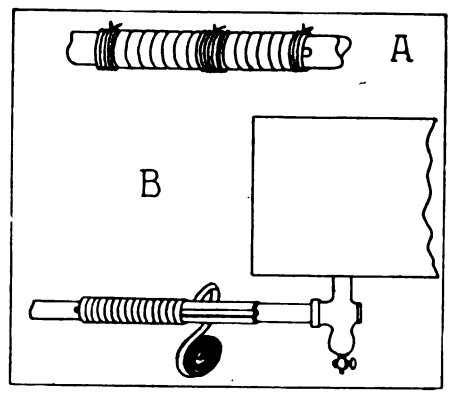
the floor boards to the board beneath the seat. These wires are not tacked to the boards at any point, but glued with rubber cement and then painted with black paint and when in place are very inconspicuous. The two ends are connected with a novel switch arrangement, as shown in the illustration. The head of the screw sticks through the seat board about 1/16 inch. When the driver leaves the car he gives a turn on the screw, which makes the contact as shown at A. When the unsuspecting thief cranks the engine he is greeted by a prolonged blast from the horn, which will continue as long as the engine is running or until the screw is turned back so as to break the connection as shown at B.

BRASS POLISH.

A suitable polish for brass parts can be made of three ounces of powdered rotted stone, two ounces of pumice stone, four ounces of oxalic acid and two quarts of rain water. Mix thoroughly and allow to stand for several days, after which it is ready for use. Shake well before applying and polish with a dry woolen cloth or chamois skin.

GASOLINE PIPE REPAIR.

In a peculiar accident that recently happened to an automobile, the gasoline pipe leading from the storage tank to the carburetor was kinked and cracked. A repair man was summoned and after making repairs to the engine, fixed the gasoline pipe as illustrated. With a hacksaw the kinked section was cut out. Next he

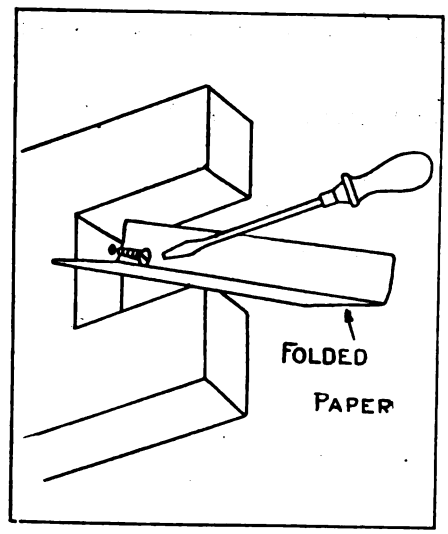


An Emergency Repair of Gasoline Line That Proved Serviceable.

removed the rubber tubing from one of the front headlights and slipped it over the ends of the metal pipe. Because of vibration, chafing was apt to cut the rubber and so the pipe was placed in splints as shown. The splints were held in place by wrapping the pipe with tape and then reinforcing with twine. The repair proved very satisfactory.

SMALL SCREWS.

We publish another suggestion of a unique and handy method for inserting small screws in inaccessible holes. The illustration is self-explanatory, a piece of



Suggestions of Method to Use in Replacing Small Screws.

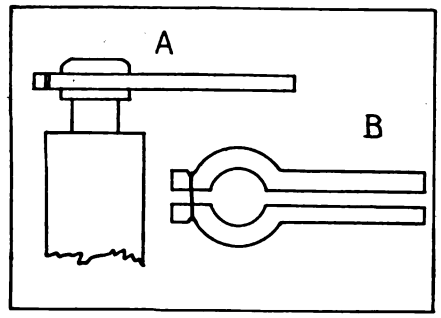
folded paper or thin sheet tin may be used. The same method may be used for guilding cotter pins or valve pins into their place.

ALUMINUM SOLDER.

An aluminum solder may be prepared from 50.03 parts zinc, 47.99 parts tin, 1.76 parts aluminum and .22 parts phosphorus. Add the phosphorus to the other materials in the following manner: Screw a cap on one end of a 12-inch length of one-inch gas piping. A tin plug may be utilized to close the other opening. Dry the phosphorus between blotting paper and expose to the air as little as possible. Remove the cap from the piping, insert the phosphorus and replace the cap. The tinned end of the pipe is next placed into molten tin, the heat of which will be sufficient to melt the plug and allow the phosphorus to mix without danger to the operator. Next add the required quantity of zinc and aluminum. The phosphorus serves as a flux and consequently no sal ammoniac or spirits are required when making a joint. An ordinary soldering copper can be used.

RADIATOR CAP REMOVER.

Owing to corrosive action of warm water and air, radiator caps frequently stick so hard as to make their removal very difficult without scratching the finish. Procure two pieces of hard wood about ¾ inch thick and cut them into the shape



Radiator Cap Remover.

as illustrated at B. Make a loop of iron wire just large enough to slip over the short ends of the wood and into the slots. The device may be used on the brightest finish without leaving a mark. Sketch A shows the device as applied to remove a radiator cap.

GRINDING ALUMINUM.

If an aluminum casting is ground on an ordinary emery wheel, the soft metal is apt to clog the abrasive material and impair its cutting efficiency. To avoid this condition, apply parraffine wax to the cutting surface of the wheel. This material will not effect its efficiency and can easily be removed when desired by appyling heat.

LEATHER AND IRON CEMENT.

To face a cast iron pulley with leather, apply acetic acid to the pulley with a brush. The action of the acid roughens the surface by rusting. When dry apply a cement composed of one pound fish glue and half pound common glue, melted in a mixture of alcohol and water. Place the leather on the pulley and dry under pressure.

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TO JOURNAL SUBSCRIBERS

In the following pages you will find listed, priced and described, a large number of articles that are used generally by vehicle owners. With hardly an exception jobbers and dealers can supply any of the parts, fittings, accessories, equipment, machinery, or tools dealt with.

The first installment of similar articles was published in October issue of the Automobile Journal. In the following numbers of this magazine many hundreds of these descriptions will be published and this great feature will be continued until practically all standard lines produced will be described.

In connection with the last installment a complete index will be published, giving issue and page number of the journal in which the articles and description was published. If prices or delivery conditions change in the meantime corrections will be made in the final index.

By retaining all numbers subscribers will have the most complete catalogue of desirable car equipment ever issued. It will have all the good features of a trade directory, a buyer's guide and a trade reference book.

Owing to new publishing requirements back copies of the Journal can not be supplied and we earnestly request all subscribers to file and retain copies.

IN THE JANUARY NUMBER OF THIS MAGAZINE 200 ARTICLES WILL BE DEALT WITH AND SPECIAL ATTENTION WILL BE GIVEN TO EQUIPMENT THAT WILL ADD TO THE CONVENIENCE AND COMFORT IN THE USE OF CARS DURING THE WINTER SEASON.

Owing to the uncertainty in securing material to this time it has been almost impossible for many manufacturers to be specific in stating delivery dates. By referring to articles you will find stated at the end of practically all descriptions the delivery conditions. When that detail is not mentioned it is assumed that any reasonable demand can be taken care of promptly.

Directory of Automobile Accessories Parts and Supplies, With Descriptions, Illustrations and Prices

This is the third part of the directory of accessories, parts, fittings, machinery, tools, equipment and supplies which is being published in the Automobile Journal and Accessory and Garage Journal. Articles that are now in production or which are being carried in stock and that can be secured by jobbers and dealers are described and illustrated, and the prices and delivery conditions are stated. This information, which can be obtained through no other medium, is being compiled from the most recent advices direct from manufacturers.

Several thousand articles will be described in this way in the forthcoming issues of the two publications up to the opening of the Spring season. In the descriptions given, where no mention is made of the maker's ability to deliver goods, it is to be assumed that the same situation would exist as under normal conditions and that the article would be procurable, subject to the transportation and manufacturing considerations of the present time.

Owing to present publishing conditions, extra copies cannot be supplied, so subscription orders should be placed at once.

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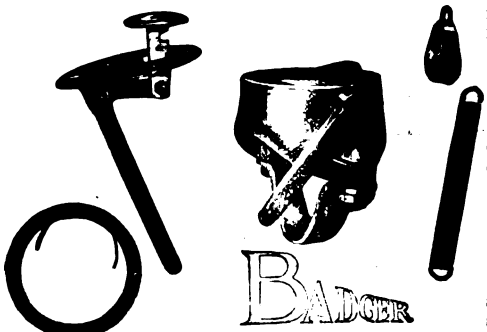
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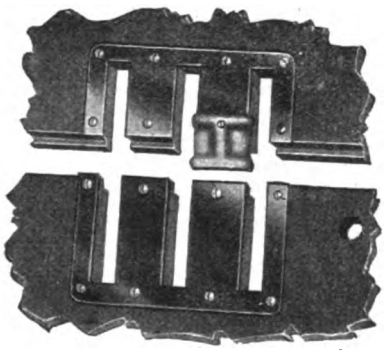


Badger Cut Out. A new muffler cut out is now on the market, which is designed for use on the Chevrolet 4-90, a car that is not equipped with a cut out at the factory. This outfit is known as the "Badger" and is easily attached to the machine. It is only necessary to cut a V section from the exhaust pipe, directly in front of the muffler, and then clamp the cut out over the opening.

The manufacturers claim this is a quality proposition and that it is designed to give service and satisfaction. The valve is made of the best grade of iron, accurately machined and has a leak-proof feature, which is exclusive with this valve.

Manufactured by the Auto Parts Manufacturing Co., 313 Milwaukee St., Milwaukee, Wis. Price quoted at request.

Midway Floor Board Holder is a device for holding the floor boards in place, so that they cannot slip down nor sideways, thereby interfering with the operation of the foot pedals, thus preventing perhaps a serious accident. With the device attached the boards can be removed as easily as before and when in place the device prevents any displacement.



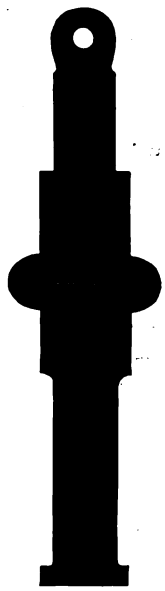
Manufactured by the Midway Mechanical Co., 1555 Selby Ave., St. Paul, Minn. Price, 25 cents each.

The Bulldog Luggage Carrier is the most efficient and satisfactory means of taking care of the luggage while motoring. It will hold grips or suit cases of any size firmly to the running board of the car, doing away with the crowding of foot room in the tonneau. When not in use the carrier can be unfastened and carried in a pocket of the car. It is made of the most substantial material throughout and will wear for many seasons.



Manufactured by the Bulldog Luggage Guard Co., 37 Elm St., Nashua, N. H. Price quoted at request.

The National Shock Absorber consists essentially of a casing through which two blades pass, the movement being controlled by a set of specially designed shoes and cam rollers. The result of this construction, the makers say, is an unique but scientifically correct mechanism, which permits perfect freedom of contraction of



body springs, thereby preserving all their initial resiliency, but so retarding or modifying the rebound as to eliminate all shock and vibration.

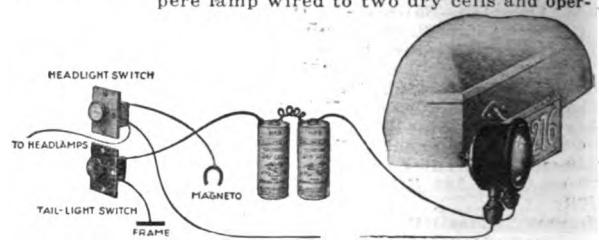
Manufactured by J. S. Lang Engineering Co., 5 Park Square, Boston, Mass. Price quoted at request.

The Fogger is an automatic device for introducing live steam into the fuel of internal combustion engines as a means to remedy the carbon deposit evil. It consists of a housing containing two chambers separated by a diaphragm. The upper chamber, which is termed the vacuum chamber, is connected with the intake manifold; the lower is connected with the water circulating system, and, through the exhaust manifold, with the intake. It is also fitted wih drain cock and air intake connection. The vacuum, from the impulse of the engine acting on the diaphragm, opens and closes the needle valve by which the water is admitted. This operation allows water and air to be admitted from the chamber to the intake manifold, and pass through the heating pipe in the exhaust manifold, where the mixture is heated, producing steam.

Elimination of carbon deposit, saving of fuel through more perfect combustion and increased power are some of the advantages claimed for the device.

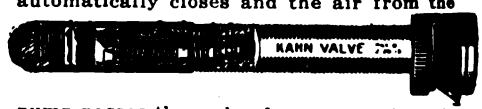
Manufactured by Motor Steam Generator Co., 417 Heed Bldg., Philadelphia, Pa. Price quoted at request.

The K-D Tail Lamp Assembly assures one of an efficient signal light whether the car is running or not. It has two bulbs, a high voltage 18-24 volt, two candle power, wired to the magneto and operated in conjunction with the headlight switch, thus insuring light when the car is running. A low voltage three-volt 42 ampere lamp wired to two dry cells and operated by a separated switch furnishes light when the engine is idle.



Manufactured by the K-D Lamp Co., Cincinnati, O. Price, $2.50.

The Kahn Automatic Valve, which is standard equipment with Armstrong tubes, is similar in outside size and shape to other tube valves. It is the internal construction that differs. Beneath the knurled collar indicated by the arrow at the top of the illustration is a graduated dial marked with five figures, 50, 60, 70, 80 and 92 pounds. The knurled collar is turned until a certain projection on its face fits into the slot above the figure indicated the pressure desired in the tube. An air supply is connected with the valve by the usual method. When the pressure in the tire reaches the desired figure the valve automatically closes and the air from the

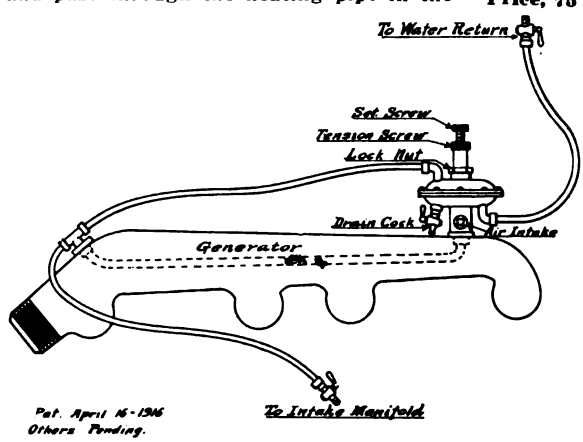


pump passes through a by-pass to the outside with a loud, whistling noise, thus giving warning that the tire has the desired pressure.

Manufactured by the Armstrong Rubber Co, Inc., 118 Adams St., Newark, N. J. Price quoted at request.

Marvel Spark Intensifier. Our illustration shows a device by which, the makers say, the spark between the electrodes of the spark plug may be intensified. They further claim that a plug short circuited from accumulated soot, carbon or grease, or broken insulation, may be made to fire as perfectly as if it were new by the use of this device.

Manufactured by the Marvel Mfg. Co., 1020 Washington Blvd., Oak Park, Ill. Price, 75 cents each, or $3 per set of four.





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Gear Shift Extension. The gear shift lever on practically all of the present day cars is not adjustable, therefore the person with short arms finds that considerable body movement is often necessary to change gears. To obviate this difficulty the Mellin's Adjustable Gear Shift Extension has been designed. This device is practically an extension lever, in three sections, that may be adjusted to suit practically any driver and by means of which the operator, with a single arm movement, can shift gears easily and without moving the body. The device is ornamental and neatly finished in nickel plate.

Manufactured by M. & H. Novelty Co., 857 East 24th St., Los Angeles, Cal. Price, $1.25 or $1.50, according to car.

Pedex, a pedal extension device, makes it possible for two persons of different height to drive the same car with equal comfort. Pedex is designed to be attached to both the brake and clutch pedals, and the use of the permanent pedals is in no



way impaired. Two adjustments are possible, so that the foot may be placed in a position of greatest comfort. In touring this article is a great help to the driver, making it possible for him to rest his feet by shifting to a new position.

Manufactured by American Car Accessories Co. 529 West 21st St., New York.

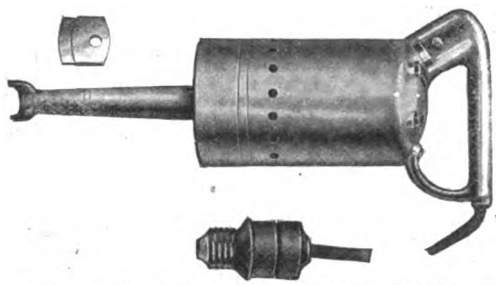
Hoyts' Rear Axle Truss, made specially for Ford cars and prevents the rear axle



from sagging, to relieve undue strain on differential and keep the differential housing in condition.

Manufactured by Hoyts Auto Supply Co., 370 Fairfield Ave., Bridgeport, Conn. Price, $1.50.

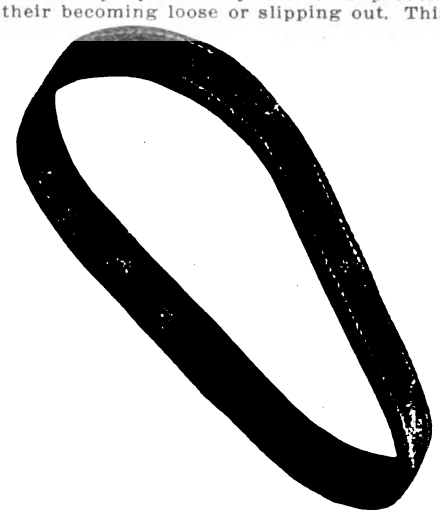
The B. F. S. Electric Valve Grinder is a compact portable motor driven device designed for grinding the valves of all internal combustion engines in a shorter length of time than is required by ordinary hand methods. The familiar oscillating motion employed in hand grinding is used by the grinder, which gives 800 to 900 oscillations per minute, a speed not obtainable in hand work. The gears are packed in grease, thus insuring perfect lubrication and noiseless operation. The switch placed conveniently in the handle is actuated by a slight pressure of the finger, starting or stopping the motor instantly. This machine weighs less than five pounds, which the makers claim is the right weight for ordinary valve grinding, and a light pressure is only necessary in cases where valves are badly pitted. Each grinder is fitted with an eight-foot cord and plug to fit the usual lamp socket and standard machines are made for 110



to 130 volt alternating or direct current. These are furnished in higher voltage if specified. Bits for standard slotted or pin hole valves complete the outfit.

Manufactured by the B. F. S. Manufacturing Co., 54 Hermon St., Worcester, Mass.

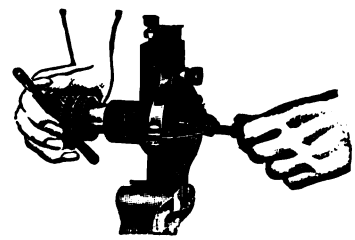
The Cork Insert Ford Fan Belt is based upon the same idea that underlies the well known cork insert transmission linings for Ford cars. In this belt circular pieces of cork are inserted into a high grade tanned and stretched strip of specially water proofed oak leather. The cork inserts are backed up by a heavy fabric to prevent their becoming loose or slipping out. This



construction is said to eliminate the slipping, which might cut down the efficiency of the belt.

Manufactured by Advance Automobile Accessories Corporation, Dept. E 3-1, 56 East Randolph St., Chicago, Ill. Price for 1917 Ford car model belt, $1. For other models, 85 cents.

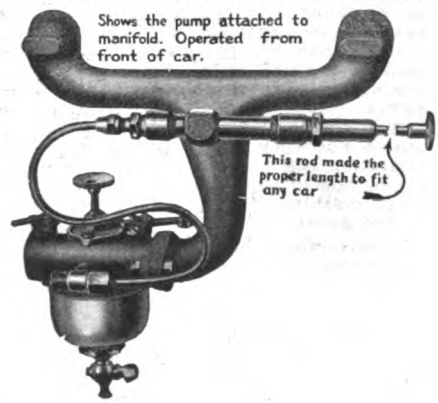
The G. B. Valve Tool is a miniature hand lathe designed especially for dressing valves. It is made of drop-forged steel, case hardened and ground until it is absolutely true. The knife can be removed and resharpened easily and is so constructed that it will dress valves of any size or material at a perfect angle of 45 degrees. The tool is so constructed that the valve



must necessarily be on center when it is dressed. The use of this tool, the makers claim, will not only remove all carbon deposit, but will dress off all imperfections on the valve or seat, such as ridges, grooves, pits, etc.

Manufactured by the G. B. G. and Mfg. Co., 299-303 Franklin St., Hempstead, N. Y. Price quoted at request.

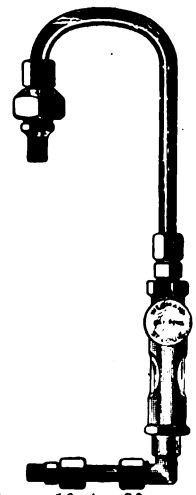
Maltby Spray Primer. A compact little device made of brass with which the manufacturers claim a gasoline engine may be started in "zero" weather is known as the Maltby Spray Primer. The primer may be attached to the manifold of any car, installed either through the radiator in hand cranked cars or through the dash in cars equipped with engine starters. The action of the primer is: A charge of gasoline is drawn into the primer by the pump action and injected into the intake mani-



fold in the form of an atomized vapor.

Manufactured by Maltby Auto Specialty Co., Battle Creek, Mich. Retail price, $7.50. Special discount to dealers.

The Wegmann Decarbonizer is easily installed. It attaches to the intake manifold and to the water supply pipe or jacket. The fine spray of live steam it injects into the combustion chamber acts as a carbon remover and the manufacturers claim its

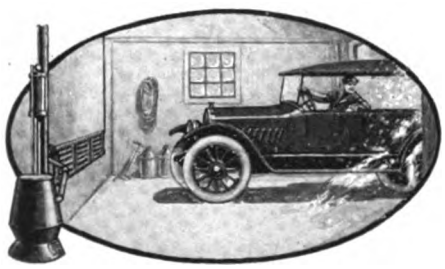


use gives from 10 to 20 per cent. more power. It is regulated by the speed of the engine and once attached and adjusted is automatic in action.

Distributed by the Manufacturers' Distributing Co., Inc., Dept. B, Fullerton Bldg., St. Louis, Mo. Price, $5.

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The Wasco Garage Heating System is a coal stove which is a well designed small boiler, for it is water jacketed from the fire box to the top. This water jacket is fitted with two connections to the radiating system and with an expansion tank which is designed to regulate the temperature of the boiler. Inside the tank is fitted an air tight float, which is connected through regulator rods with a griddle damper in the chimney. As the water in the radiator reaches a predetermined temperature its expansion in volume raises the float in the expansion tank and closes the damper. As the water is cooled and contracts the lowering of the float opens the griddle damper and the increased draught causes the fire in the stove to



burn brighter. The radiating system is of the unit form, each radiator measuring 13 inches by seven feet three inches. It is designed for heating one automobile space, more units being added for larger installations. It is said that the system consumes very little coal, as for a one car system, one skuttle of coal daily will suffice. Because of the automatic regulating device temperature the system requires but very little attention. The installation is simple, as all joints are made up to specifications at the factory and fitted, nothing is required but assembling in the garage.

Manufactured by W. A. Schleit Mfg. Co., Inc., Syracuse, N. Y. Price quoted at request.

The Ideal Junior Seat will fit any make of automobile now on the market. It is substantially made and finished and when in place becomes a part of the automobile. A bracket is fastened to the floor board with three bolts and always remains on the car. This bracket has a tapered hole for receiving the upright seat support, the end of which is also tapered to fit bracket. Similar arrangement is made on the bracket fastened to underside of seat. This



feature makes it a simple matter to detach the seat from the car, detach upright support from seat and store away in a very small space.

The seat can be adjusted from side to side or front to back for a distance of six inches when desirable, but when in place the tapered sockets do not permit seat to turn or swing around.

Manufactured by Ideal Brass Works, Indianapolis, Ind. Price, $2.50 each, complete with bolts.

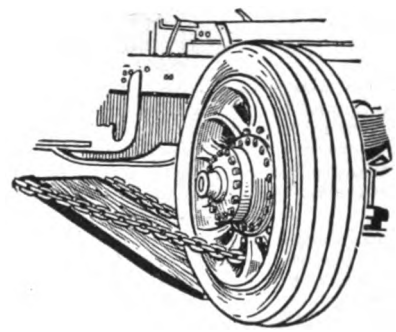
Moore's Mud Hole Skid. A patented device, known as Moore's Mud Hole Skid, is, as the name implies, intended for use with any power vehicle, utilizing the driving effort to extricate it wherever traction is not normally obtainable. Statement is made that it is an exceptional utility with any truck, because it can be carried and be always available, and that it will economize time, labor, fuel, tires and perhaps



repairs. The accompanying illustration shows the device and manner of using it. With a pair of the Moore skids any emergency can be met.

The skid is a section of plank with one end tapered so it may be forced into mud or sand, that is strengthened by a binding band of heavy metal. At the other end of the plank, retained by two stout clamps, is an iron bar, the ends of which are turned at right angles to the main section and carry rings. One end of a chain more than twice the length of the skid is secured to one of these rings and at the other end of the chain is a hook.

When used the tapered end of the skid is forced under the tire of a driving wheel that has no traction. The chain is carried between spokes back of the axle center



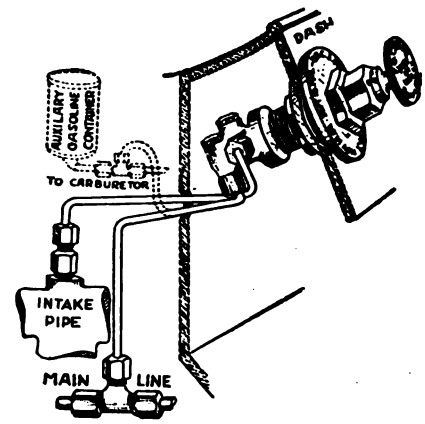
so there will be draft upon it as the wheel is turned. The other end of the chain is hooked to the ring at the broad end of the skid, and the slack taken up. When the engine is started the turning of the wheel will wind the chain on the brake drum and the wheel will roll along the skid. After the wheel is well on the skid and traction is positive the chain is cast off.

Manufactured by Langley & Schultze, Louisville, Ky. Price quoted at request.

The Gardner Thermostat Carburetor is automatically adjusted to either heat or cold. The makers claim it to scientifically and automatically maintain the correct proportion of air and fuel to suit the varying speed or load of the motor. It is free from moving parts and thermostatically regulated, giving more gasoline to start and automatically cutting off the gas as the engine warms up. This thermostat is submerged in the gasoline and its action is controlled by its temperature and varies as the changes of temperature require.

Manufactured by the Gardner Carburetor and Brass Works, Summit Ave. and Wabash R. R., Detroit, Mich. Prices quoted at request.





The New Crone Primer is designed to facilitate the starting of the engine and save the starter batteries. It sprays a fine cloud of combustible gasoline at a point where the first spark starts the engine, only one or two operations of the primer starter being necessary. When not in use the valve is seated tightly and locked in position by turning the handle either to the right or left. Attachment is by boring a ¾ inch hole through the instrument board and fastening by a lock nut, and tapping manifold for a ⅛ inch gas pipe tap. The plunger is the full size of the barrel, which obviates the use of washers. The primer has no parts to wear out.

Manufactured by F. G. Crone, 334 Genesee St., Buffalo, N. Y. List price with fittings, $5.

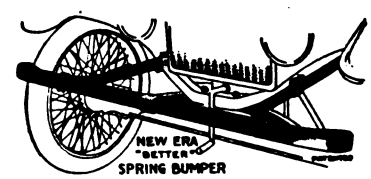
The U. S. Safety Lock gives one the modern method for locking the Ford car to prevent it from being stolen. It is new in principle and the Yale tumbler lock of the latest design is used, which absolutely does away with key trouble. By removing the Yale key the car is



locked and the steering wheel spins free, no lifting or pulling is necessary.

Manufactured by the U. S. Auto Lock Co., 3845 Wabash Ave., Chicago, Ill. Price, $7.50.

New Era "Better" Spring Bumpers are light, strong and neat. They are made of 1¾x5/16 inch spring steel, and the construction is such that bumpers made of this size have greater resisting power and absorbing qualities than bumpers of other construction made of steel wider and thicker. The construction is double front



bar full length with center tie, giving maximum strength from end to end. When an angle blow is received the vibration is distributed and absorbed throughout the entire length of the bumper and attaching arms.

Manufactured by the New Era Spring and Specialty Co., 1177 Hamilton Ave., Grand Rapids, Mich. Price quoted at request.

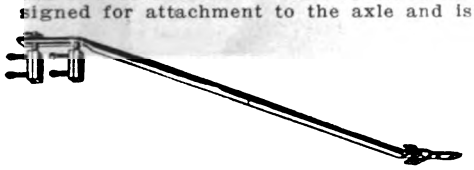
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Garco Gaskette Roll was devised for the countless small repair jobs where a cut piece of sheet packing is needed. It is made of specially selected long fiber asbestos with a network of strong fine wire interwoven in it, giving it the greatest possible strength and wear resisting ability. It is packed in a durable, dust proof carton cut 10 inches wide by 40 inches long. It is also furnished in full rolls of 250 pounds and half rolls of 125 pounds.

Manufactured by the General Asbestos and Rubber Co., Charlestown, S. C. Price quoted at request.

The Dyer Towing Device is a simple arrangement for fastening to the front axle of a Ford car and making possible the towing of the car by another without the aid of a second driver. The device is designed for attachment to the axle and is

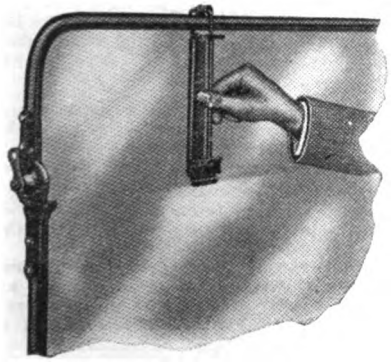


fitted with a clamp, which is fastened to the steering spindle connecting rod. The other end of the device is fastened to the towing car. When a corner is turned the rear car is automatically steered by the device.

Manufactured by the G. H. Dyer Co., Cambridge, Mass. Price quoted at request.

The Clean-All Windshield Cleaner by its extreme neatness adds to the appearance of any automobile. This cleaner cannot rust or rattle. The windshield can be turned down with the cleaner attached and it is so designed that it cannot break the glass. It is always out of the driver's way, but never out of his reach and is constructed of the best material obtainable for hard, practical use.

Manufactured by the Clean-All Windshield Corporation, 257 Washington St., Buffalo, N. Y. Price, $1.50.



H. & H. Steel Locker. An employer has a certain responsibility toward his employees and is morally bound to furnish them with some form of locker for their coats, hats, etc. The H. & H. Steel Locker solves the problem of cost as well as space. The locker illustrated is called type B-C, and adds to the attractiveness of coat rooms, as well as provides for spacious, sanitary and safe storage accommodations.

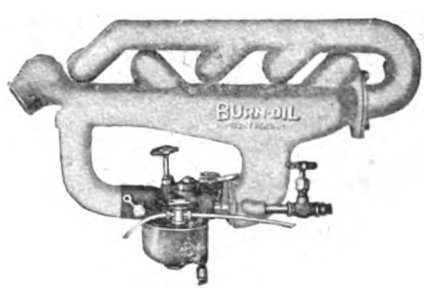
The door frames are made from one solid steel of No. 14 gauge, cold rolled steel, flanged one inch on both outside edges and formed at the bottom to provide six-inch legs. The back is made of one piece, flanged one inch on both edges, extending from the top to the floor. The sides are bolted to the front and back. The doors are made of No. 14 gauge steel, reinforced with steel channel construction and hung on the frame with three solid two-inch fast pin butts. They are louvered with six openings at top and bottom to admit air for circulation, and if required may be



cut with louvers over the whole area. The design of the lockers permits the assembling of practically any number side by side, forming an unbroken surface. Standard sizes ranging from one foot square and five feet high to two feet square by six feet high may be obtained.

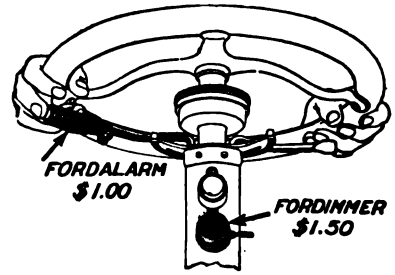
Manufactured by the Hart & Hutchinson Co., 654 Oliver Bldg., Boston, Mass.

Burn Oil Device. Every car owner should be interested in the problem of conservation of fuel and reduction of operat-



ing expense. To a certain extent the use of kerosene instead of gasoline as a fuel is the solution of one of the main difficulties. The Burn Oil Device is designed for attachment to the Ford car carburetor. When this device is used the engine is started on gasoline, then the three-way valve turned, kerosene admitted and the engine run on kerosene. In addition to this, water is admitted to the manifold through a needle adjusting valve. The whole device is simple and easily attached, the makers claiming a 50 per cent. saving on the cost of fuel.

Manufactured by Burn Oil Device Co., Inc., 129 N. Jefferson Ave., Peoria, Ill. Price complete, $30.





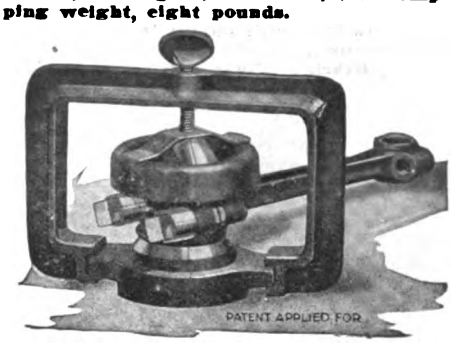
Fordimmer and Fordalarm. The first is called the Fordimmer. By the use of this device the headlights may be dimmed at will by the driver, thus preventing headlight glare, which in many cities is prohibited. It is also a safety device in that the lights are kept from burning out at high engine speed. It is claimed that the voltage is regulated and that the ignition system is not affected by its use.

Many an accident has been caused by the dividing of the attention of the driver between the horn button and the wheel at a critical moment. At such a time both hands should be kept on the steering wheel. This situation is made possible by the use of the Fordalarm, a button mounted just beneath the steering wheel, on the end of the gasoline control lever. In emergencies the driver's hand is usually on this lever, and the second finger of the hand is always in position to press the alarm button if necessary and sound the horn.

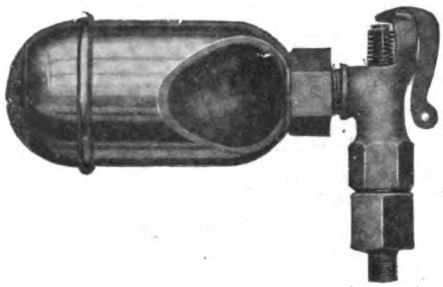
Manufactured by Detroit Novelty Mfg. Co., Marquette Bldg., Detroit, Mich. Price of Fordimmer, $1.50; Fordalarm, $1.

The Babbitter for Ford Cars is especially designed to re-babbitt Ford connecting rods, quickly, economically, accurately and in a serviceable manner. Ford parts are standardized, so that the mandrel of this tool could be made so that it would cast the bearing to the thousandths part of an inch, ready to fit the crankshaft for the usual "burning in" process. After the metal is cast and hardened the top of the mandrel is struck a blow with a hammer to disassemble the parts and a few strokes of a rough file is all that is necessary to finish the rod for the engine. This device will babbitt Ford connecting rods at the rate of three to four an hour and at a saving of $1.75 to $2.50 on a set of four connecting rods.

Manufactured by the Burlington Machine Works, Burlington, Ia. Price, $15. Shipping weight, eight pounds.



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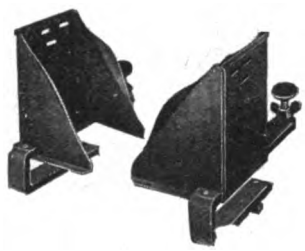


Buell Explosion Whistle. A distinctive and new warning signal is introduced under the trade name of Buell Explosion Whistle. As the name indicates, this device is operated by the pressure caused by the explosion in a gasoline engine. Mechanically it consists of a fitting which may be screwed into the engine in place of the priming cup and in which is fitted a small poppet valve of ½ inch in diameter. The valve is opened by a control cord which may be fastened to the steering column, allowing a small amount of gas to pass through it and operate the whistle. The makers sell the device under a 10 years' guarantee and claim that under ordinary conditions it will last longer than the car itself.

The warning is said to be distinctive enough to command instant attention even above all other traffic noises.

Manufactured by Buell Co., 1610 So. Michigan Ave., Chicago, Ill. Price for single tone with valve, $4.25; chime model with valve, $6. Special plug without whistle for Ford car attachment, $1.25. Whistle extra as above.

Adjustable Holder. The illustration shows a handy and easily adjusted canteen or suit case holder, which may be attached to the running board of any car. This device is adjustable, so that in it may be carried practically any object eight inches wide and less than the length of the running board. Adjustment is secured by wing nuts, which are located on the top of the



device. With every holder, which consists of two parts, is furnished a holding strap.

Manufactured by Leslie E. Moore, 1042 S. Olive St., Los Angeles, Cal. Price, $2.25 per set.

The Gant Meter. One of the small and often neglected wastes in a supply house is due to the fact that not enough care is exercised in measuring ignition cables and wiring. Inches soon add up to feet and mistakes mean money where secondary cable is concerned. The Gant Meter is a device which is said to accurately measure any size of cable, rope or wire drawn through it from one-quarter inch to one inch in diameter. This device is strongly and compactly constructed, finished in green, with large gilt numerals.

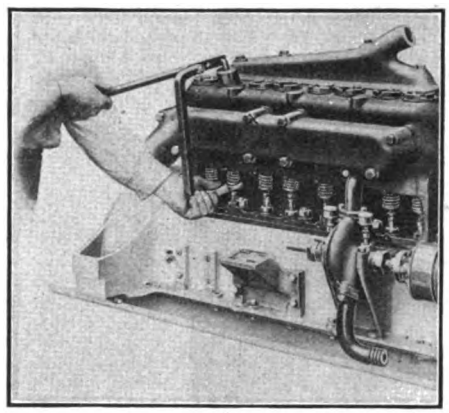
Manufactured by the E. M. Gant Mfg. Co., Inc., Ethridge, Tenn. Price, $5.



The Buda Valve Lifter is designed especially for the Buda engine. If an engine is to deliver its full capacity on a minimum of fuel, careful attention must be given to the matter of keeping the valves in proper shape.

The removal of valves for inspection or grinding is a difficult task with the tools usually furnished as part of the equipment of trucks and tractors. Added to this there is the liability of doing serious injury to the valve stems or push rods.

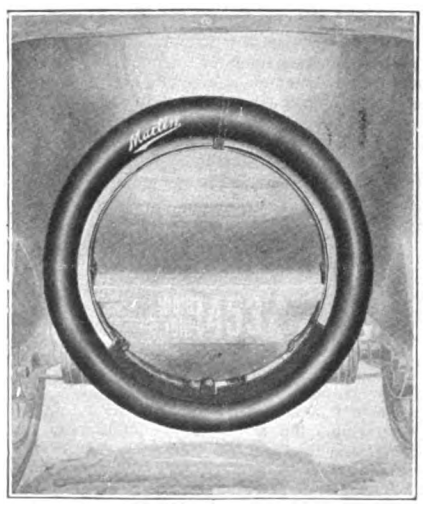
To simplify the removing of valves the Buda company has placed on the market a valve lifter, which is shown in use in the accompanying illustration. This tool can be used on all models of Buda engines except the RU. By substituting a smaller



block to fit the porthole openings, the tool can also be used on that model.

Manufactured by the Buda Co., Harvey, Ill. Price quoted at request.

Martin Tire Cover. When the traveling motorist is forced to replace a worn out shoe with the "spare" which he has been carrying upon the running board, he is very apt to feel that his troubles for the time being are over. If he has been far sighted enough to protect this "spare" shoe from the sun, rain, mud and dust, then he has a right to expect full service from it; if not, then he alone is to blame. The Martin Tire Cover, illustrated, is made of the best enameled drill, water proofed and



said to offer perfect protection to the shoe. It is designed to fit the tire and offer not only protection, but present an attractive appearance. Tire covers are manufactured by this firm for use on "spares" that are carried on demountable rims. Specifications furnished upon request.

Manufactured by the Martin Mfg. Co., Lancaster, O. Price for Ford Tire Covers, $1.75.



American Sonoscope. A cheap, serviceable and efficient little device for the repair man's use in locating the knocks in an engine is sold under the name of the American Sonoscope. This instrument consists of a neat receiver with rubberoid casing, which has a cap to fit the ear, and of a sectional test rod which can be taken apart for convenience in packing. All the metal parts are nickel plated and it is furnished packed in a neat box.

The makers claim the Sonoscope is so sensitive to sound that if the free end of the test rod is placed against the outside of a person's watch pocket the ticking of the watch will be as plainly heard in the instrument as if the watch itself were held against the ear.

Manufactured by the American Electric Co., State and 64th Sts., Chicago, Ill. Price complete with carrying case, $1.50.

Pipe and Cigar Lighter. There is nothing more annoying to the motorist than to be obliged to slow up his car or pull up to the curb in order to light his pipe or cigar. The device shown in the illustration herewith is designed especially for lighting the pipe, or can be used equally well for lighting a cigar or cigarette. When the motorist wishes to light his pipe or cigar he simply reaches for the lighter, takes it from the holder, presses the button and a



light is immediately available, wind or weather making no difference to the action. The pipe lighter is equipped with 10 feet of cord and designed for connection with the storage battery. The cord is automatically reeled up when not in use.

Manufactured by the Metal Specialties Mfg. Co., 732 West Monroe St., Chicago, Ill. Price complete with winder, $4. Without winder, $1.50.

The Townsan Valve Adjuster and Silencer for Fords eliminates the click of the valves and takes up the wear. It is adjustable from time to time and can be placed on every valve, regardless of play,



for it takes up play from the thickness of one disc, .006 inch and upward, to the amount necessary to quiet the valve.

Manufactured by the Midway Mechanical Co., St. Paul, Minn. Long sleeve of all models previous to 1912, and short sleeve for 1912 model and later. Price quoted at request.

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Ekern's Portable Work Bench and Engine Stand is especially designed for use in Ford repair shops, although there are various uses to which it can be put in general repair shops. The stand is mounted on three four-inch diameter wheels. The rear castor wheel is constructed so that by pulling a plunger pin this castor will swing up off the floor and the stand will rest solidly upon its legs. It has two large trays 22x24 inches, where the workman can place his tools or engine parts. A Ford engine assembly can be attached to the stand by the two cap screws which hold the water inlet connection on the engine. The part attached to the engine will revolve in the clamp on the stand, adjusting the engine to the position most convenient to be worked upon. The bench is also equipped with a vise, which has a



three-inch jaw with a four-inch opening. This vise will handle any work required in overhauling the Ford engine or other work of a similar nature.

Manufactured by the Ekern Bros. Manufacturing Co., Flandreau, S. D., and distributed by H. G. Paro, 1410-14 S. Michigan Blvd., Chicago, Ill. Price quoted at request.

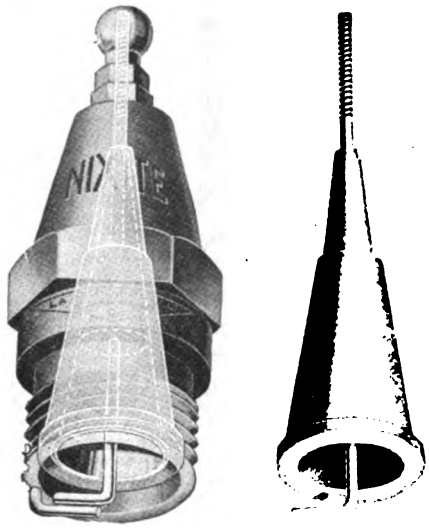
Martin Door Pocket. Among accessories designed for Ford and Chevrolet cars that are useful as well as ornamental, is the Martin door pocket. This pocket is made of high grade leather cloth and is guaran-



teed not to crack or peel. Such a pocket offers space for carrying route books, pamphlets or small tools, and are very convenient, utilizing unused space to the the best advantage.

Manufactured by Martin Manufacturing Co., Lancaster, O. Price, 75 cents.

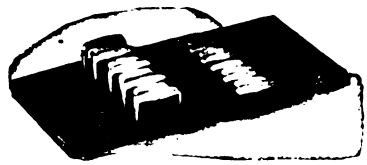
Nixite Spark Plug. A plug which is claimed to be entirely different from anything now on the market is called the Nixite Spark Plug. The electrodes, as will be noted in the illustration, are so designed as to permit a broad, thick spark, which is claimed to result in both quick and perfect combustion. The insulating material is a new product, called Nixite, and is mounted inside a special steel shell, which offers protection from breakage. The exterior or outside part of the plug is similar in ap-



pearance to an ordinary plug, but the material at the top is Bakelite. This material offers protection against breakage from outside blows. The manufacturers cover the plug with a "life" guarantee and state that any part of the plug will be replaced free of charge if returned to the factory in the box, together with 10 two-cent stamps, to cover cost of packing and transportation.

Manufactured by La French Power Spark Plug Co., 16-18 East First St., Columbus, O. Price, $1 each.

Bristol's Steel Belt Lacing. An important factor in power transmission is belt condition. Belts that are not flexible or not properly joined at the ends absorb much power, thereby increasing the cost



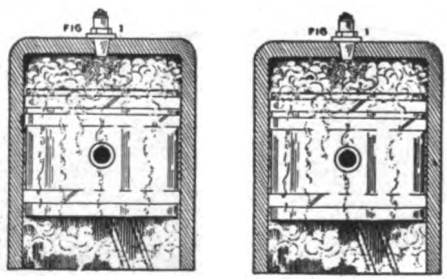
of overhead. The Bristol belt fasteners are made in many sizes and designed for practically any weight or size of belt. They are made from especially tested cold rolled steel by a patented cutting method which eliminates waste, thus bringing down the cost.

The application to the belt is easy, and when applied the joint resembles, in general lacing design, that of a raw hide laced belt.

Manufactured by the Bristol Co., Waterbury, Conn. Price quoted at request.

The No-Leak-O Piston Ring or Oil Sealing Ring is a specially designed piston ring that has a deep groove cut around the face of the ring with a scraping edge, in combination with a lap joint, which is said to form a perfect seal of oil; that is to say, with the groove full of oil around the ring, the gas cannot escape, the refuse of poor oil cannot work into the crank case, nor can the oil from the crank case work into the combustion chamber.

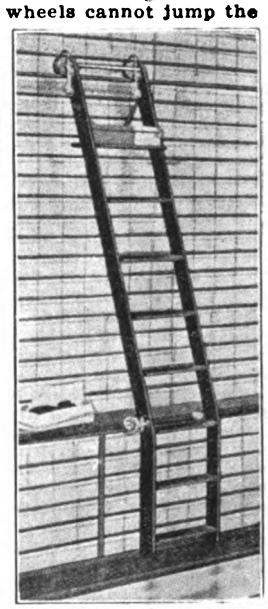
Automobile Accessories Co., 816 W. North Ave., Baltimore, Md. Price quoted at request.



Milbradt Step Ladders. In a garage, supply station, accessory store or stock room it often happens that many of the articles frequently used are packed high upon the shelves or in drawers, which are above reaching distance. A rolling step ladder such as is shown in the illustration is an extremely handy part of the equipment and fully as important as the shelves themselves, if the saving of time is any object. The Milbradt Rolling Step Ladders are made in many styles and to fit practically any shelf or drawer arrangement. They are made to order of hard wood lumber (usually oak), nicely finished with suitable fixtures at the top and to run on either steel or wood track.

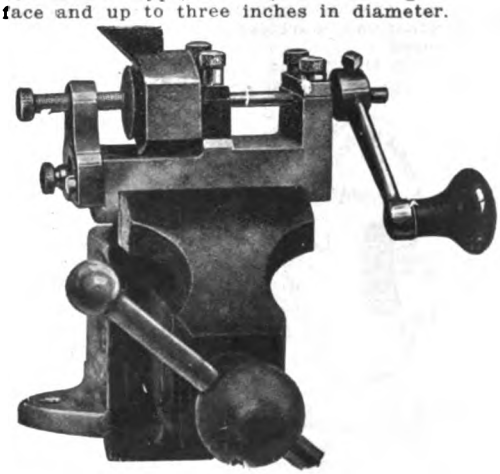
They may be had to roll on the floor or against the side of the shelves, and it is said that a slight push will propel a ladder the length of an ordinary store, even with the operator on it.

Two styles of track are used, wood upon which rolls iron wheels, or steel track upon which rolls paper filled wheels. In either case the fittings are so arranged that the wheels cannot jump the track.



Manufactured by Milbradt Manufacturing Co., St. Louis, Mo. Price quoted at request.

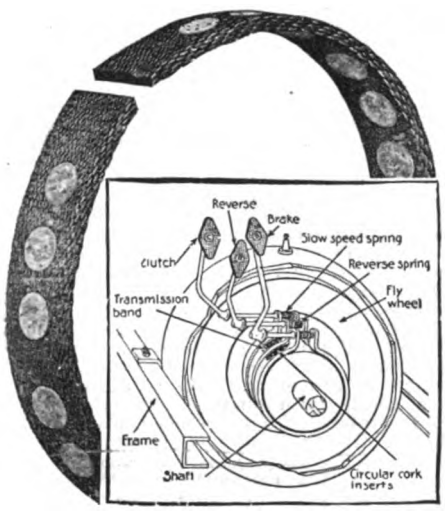
The Sioux Refacing Tool is designed for refacing valves and will reface any valve of standard type, that is, with 45 degree face and up to three inches in diameter.



For valves of 30 or 60 degree faces extra cutters are obtainable. The cutters are made of tool steel, hardened, tempered and cut to the correct angle. The manufacturer claims that no experience is necessary for operating the tool and that finished jobs are obtainable in a surprisingly short time, even by inexperienced men.

Manufactured by Albertson & Co., Sioux City, Ia. Price, $6 with one 45 degree cutter; extra cutters, 75 cents each.

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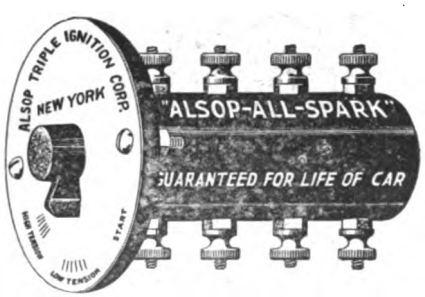


Transmission Lining. There are few things as uncomfortable as a grabbing clutch, or a harshly engaging brake band. The Ford low speed clutch, reverse and service brake action is dependent upon contracting bands, which must be lined with some sort of fabric to make them efficient. For this purpose the Advance cork insert transmission lining has been designed. It is made up of a tough fabric into which are inserted pieces of cork. The manufacturers claim that when a car is fitted wth this type of lining the clutch, as well as the service brake, engages smoothly and with a velvet action, due to the soft frictional bearing of the cork inserts.

Manufactured by Advance Automobile Accessories Corporation, 56 East Randolph St., Chicago, Ill. Price quoted at request.

The "Alsop-All-Spark" is claimed by the makers to make possible the use of old dead carbon choked spark plugs with as good results as can be gotten from new ones without this device. It goes much further than the saving of spark plugs, as the reinforced spark is a more positive exploder of the gasoline. When it is considered that there are more than 5400 sparks per minute in a six-cylinder engine, which runs 3600 revolutions per minute and only a certain per cent. explode the gas, it can be readily seen that a device which gives such a powerful spark will penetrate through heavy oil and spark dead carbonized plugs, will certainly cause a great deal more explosions per spark delivered.

With this device it is seldom ever necessary to change spark plugs, as a slight



turn of dial on the dash will raise the voltage to such an extent that it will overcome any misfires, no matter in what condition the plug may become.

The device screws upon the dashboard and is controlled by a dial inside the car. It is connected between the spark plugs and distributor and will not interfere with any present equipment. The makers claim it to work equally well upon any ignition system. Easily attached in a few minutes.

Manufactured by the Alsop Triple Ignition Corporation, 1765 Broadway, New York City, N. Y. Price for all four cylinder cars, trucks and tractors, $6.

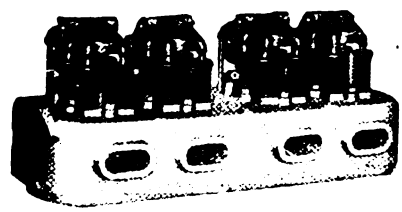
The Apco Brake Shoe Adjuster fills a long needed want for the Ford car. Without these the Ford brake shoes when half worn are useless and of course must be removed. With this adjuster, which consists of specially hardened steel thimbles, which are driven over the brake shoe cams, the brake shoes may be totally



worn. After their removal the adjusters may be used over again, as they do not wear out. The installation is a matter of a few minutes using a hammer. Each set is packed in a box weighing two ounces.

Manufactured by the Apco Manufacturing Co., Providence, R. I. Price quoted at request.

The Peugeot Type Cylinder Head should be an attractive proposition for the owner who is remodeling his Ford car for speed work. This cylinder head is made of a special grade of semi-steel nickel plated and water jacketed, and fitted with 16 overhead valves, which open directly into the explosion chamber and are operated through push rods, which extend to the regular Ford tappets. The design is such

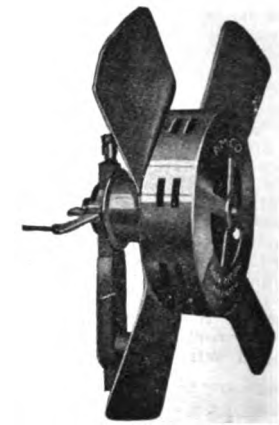


that the spark plugs are located in the center of the combustion chamber. All holes in the cylinder and manifold are Ford standard, therefore no drilling or tapping is necessary. The application of this head is very simple and the makers claim an increase of approximately 100 per cent. in horsepower and much gasoline efficiency.

Manufactured by Laurel Motors Corporation, Anderson, Ind. Price, $95.

Accessory Display Case. The development of the accessory business in the past few years has brought about the manufacture of a show case designed especially for the attractive display of automobile accessories. The accessory display case not only makes it easy for the motorist to select what he desires, but, in addition, the attractive arrangement and display of other accessories creates extra sales. This case is built in standard lengths from five to 10 feet, with from 35 to 70 drawers, depending upon the length of the case. There are five tiers of drawers, which vary in size, and each drawer is fitted with a bronze pull and card holder, so that the description and price of each article can be read easily.

Manufactured by the Detroit Show Case Co., 459 Fort St., W. Detroit, Mich. Price quoted at request.



The Fanhorn. A unique, new device of warning signal has just been put on the market which is said to be different from every other warning. The Fanhorn, as this distinctive type of signal is known, is designed to emit tones whose volume and penetration is in direct proportion to car speed. This result is achieved by the simple expedient of making the Fanhorn a part of the engine fan, in fact, the entire device is merely substituted for the present fan on any car, with no other alterations.

The tone of the Fanhorn is best described as a cross between a whistle and a whoop, both pleasing as well as commanding, and the pitch changes with the engine or car speed. The position of this new type of signal at the extreme front of the engine compartments avoids obstructions to the sound.

The horn is worked merely by pressure upon a button, which admits air into the apertures on the fanhorn drum, setting in motion an internal, revolving slotted disc, which causes the tone.

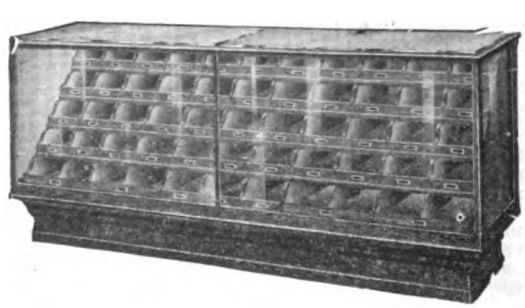
The manufacturers guarantee the material and workmanship of the new signal for a full year, and stand back of the dealer on a broad money back if not satisfied policy.

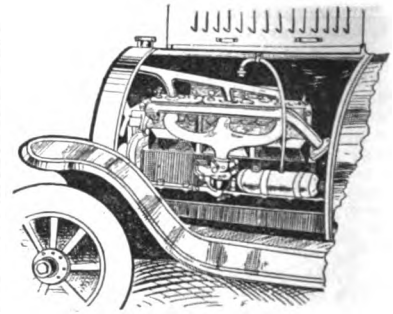
Manufactured by the Art Metal Manufacturing Co., Cleveland, O. Price quoted at request.

Fire Extinguisher. An automatic fire extinguisher is shown in an accompanying illustration. It consists of a smaller copper tank containing a power plant and extinguishing fluid, a fusible release plug, nozzle attachment and brass fittings so arranged that contents are under perfect automatic control.

At first sign of fire it goes automatically into action, driving a liquid with great force through a spray nozzle so directed that it floods engine and equipment with a chemical said to be harmless to metal or fabric, but dealing an instantaneous death blow to fire, smothering it beneath the closed hood and eliminating all personal danger and preserving the appearance of the car. The recharging of the power plant once a year or refilling after use is all the attention required.

Manufactured by Luzerne Lumber Co., Luzerne, Pa. Price quoted at request.



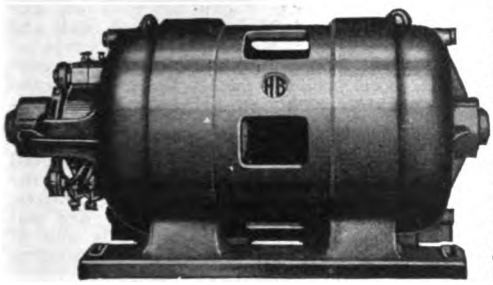


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The Hobart Battery Charger meets the requirements of the garage man who intends to do an extensive business in the battery charging line, or for the garage which makes a specialty of this line of work.

The current generating outfit consists of a standard alternating current motor with generator in the same housing, the shafts of motor and generator armatures being integral. By means of the device alternating current is converted into direct current for charging storage batteries.

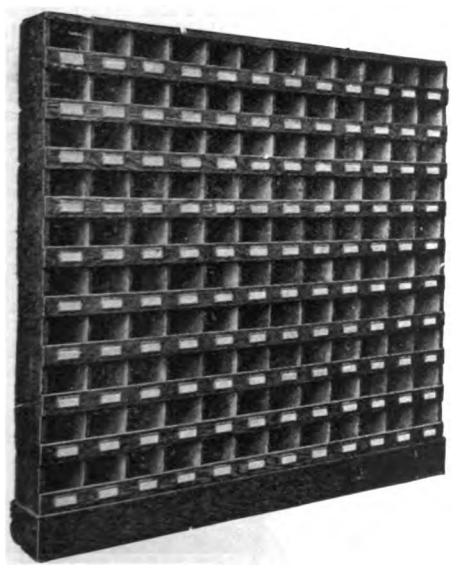




For charging panels are provided, each fitted with snap switch, rheostat, fuse, ammeter and binding posts, for connection with four distinct battery charging lines. By means of this equipment different voltage batteries can be charged in the same line, or batteries requiring different charging rates taken care of at the same time.

Manufactured by Hobart Brothers Co., Troy, O. Price quoted at request.

The Accessory and Parts Stock Bin illustrated herewith supplies a convenient and economical equipment for handling an extensive amount of stock and parts, such as valves, springs, bolts, piston rings, bearings, cones, grease cups, etc. It is attractive in appearance and makes a more

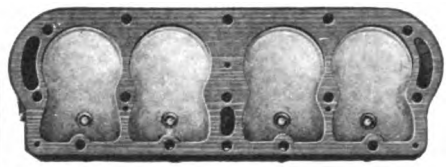


practical and flexible equipment than the average built in set of shelves.

The bin contains 120 compartments, 6x8x10 inches, a size large enough to take care of practically all of the ordinary accessories and small repair parts. The front partition and ends of the bin are genuine oak, with a light grained finish. The back is of sheet steel. Each compartment bears a metal card index holder.

Manufactured by Hobart Bros. Co., Troy, O. Price, $25.50.



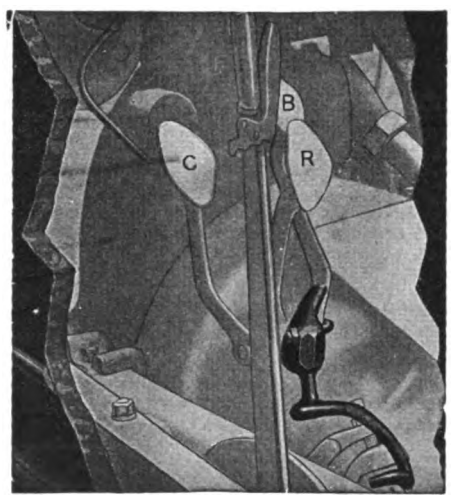


Hudson Type Cylinder Head. A new cylinder head for Ford cars has just been put on the market which should be an interesting fitting for Ford owners desiring to secure more speed and better combustion. This cylinder head, which may be interchanged with the standard Ford head in but a short time, is built of cast iron and constructed with an extra large water jacket holding approximately half a gallon more water than the standard head. The water jacket completely surrounds the spark plugs, thereby keeping them cool at all times. It is said that better water circulation is secured because of the increased water passage size. The largest part of the combustion chamber is directly over the valves while the inside is perfectly smooth.

It is said that with this new cylinder head there is a noticeable increase of power, and that there is a saving of fuel.

Manufactured by Green Engineering Co., 34 S. St. Clair St., Dayton, O. Price quoted at request.

Noble Safety Brake. Until a driver has been on the verge of an accident he does



not know just how quickly his brain can act and how soon he can get control of his car. As a general rule an excited driver will grab for his emergency brake and if the brake is efficient he may avert an accident.

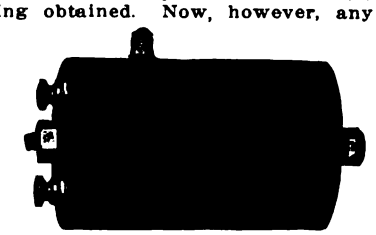
For the purpose of adding to the efficiency of the emergency brake of the Ford car, the Noble Safety Brake device has been manufactured. This device is so arranged that upon application of the emergency the service brake is automatically applied. The driver's attention need not be divided between the service and emergency brakes, but concentrated on the emergency lever at all times.

The manufacturers of this device claim that the braking action where equally distributed between the wheels and transmission is smooth and easy and that maximum braking efficiency is attained.

Manufactured by Hughes Manufacturing Co., 1806 South Michigan Ave., Chicago, Ill. Price, $2.25.

The Jefferson Electric Manufacturing Co., Chicago, Ill., recently placed on the market a line of battery replacement coils and fittings which are sufficiently flexible to displace any type of coil on battery equipped cars. The extreme flexibility of Jefferson coils is obtained from several features, which include the fittings, adjustable caps, terminals and mounting arrangements.

With a small stock of Jefferson coils any service station, garage or repair shop will be prepared for any emergency. Heretofore it has been necessary to lay up a car for several days while a new coil was being obtained. Now, however, any car



can be placed in service within a few minutes. It is only necessary to remove the old coil and connect a Jefferson coil. Starting conditions require a coil that will produce a hot spark when the battery is at the lowest ebb. Jefferson coils are guaranteed to take care of this extreme condition.

To aid jobbers, dealers, service stations and garage men the Jefferson Electric Manufacturing Co. have compiled a folder containing complete and authentic data covering all standard battery ignition systems. This folder lists all makes of cars from 1912 to the present date, and gives the year, model, type of ignition and style of Jefferson coils to be used for replacement. This folder will be sent free of charge to any dealer, garage, service station or jobber. Requests for the folder should be addressed to

The Jefferson Electric Manufacturing Co., Congress and Green Sts., Chicago, Ill. Prices quoted at request.

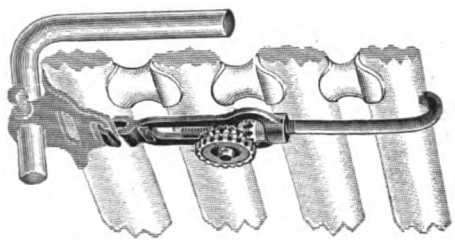
The Ever-Right Gasoline Gauge for Ford cars is a device designed for indicating the amount of gasoline in the tank at all times, and obviates the necessity of using a dirty stick or ruler. It is so arranged that the cork bobber and indicator rod is held flush with the top of the tank by a



swivel catch. When it is desired to find the gasoline height the swivel catch is moved to one side, allowing the indicator rod to slip up through the cap. Notches in the rod indicate the amount of gasoline in the tank.

Manufactured by Ever-Right Products Corporation, Broadway, at 57th St., New York. Price, $1.

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Top Bow Clamp. Every driver knows the aggravation caused by unusual knocks and noises about his car and does his best to keep them reduced to a minimum. Being subjected to so many varying stresses and strains, rattles and squeaks develop quickly, particularly where parts are subject to expansion, such as top holding straps, etc. To eliminate this trouble the Mosco Ford Top Bow Clamp has been designed. This device hooks on to the bow brace and over the top of the bows when they are folded back. By means of a small hand wheel the tension on the bows may be increased and the bows held rigidly into place.

The manufacturers claim that no amount of shaking will force the holder from its grip, neither will it slip nor mar the finish of the bows.

Manufactured by Motor Specialties Co., Waltham, Mass. Price quoted at request.

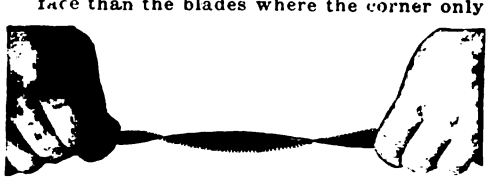
The Moto-Meter is the danger signal of motor trouble. Every defect in a motor, such as a leaky piston ring, warped valves or empty oil reservoir, is instantly reflect-



ed in the temperature of the water and the Moto-Meter immediately registers "danger." The car operator cannot fail to see the signal, as it is directly in his line of vision and no one will intentionally disregard signs of a defectve engine. The new model is designed especially for Ford cars.

Manufactured by the Moto-Meter Co., Long Island, N. Y. Standard size, $10; the Overland, $10; the Junior, $5, and the Midget, $2.50; Ford size, $2.50.

The Atkins Hack Saw Blades have teeth which are milled and set so that they present the square point to the material which is being cut, instead of a corner, as in many other blades. This feature greatly increases the cutting capacity, for with an equal blade travel the blade has fully 25 to 50 per cent. more cutting surface than the blades where the corner only

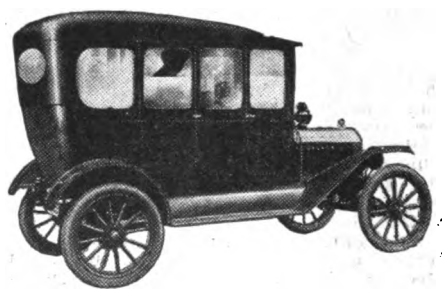


is used. These blades are made of an exceptionally fine grade of alloy steel, which responds to scientific heat treatment in a perfect manner. Made in all sizes.

Manufactured by E. C. Atkins & Co., Inc. Price quoted at request.

The Anchor Top and Body is built in a complete line of demountable winter tops for Overland, Oakland, Buick, Ford, Dodge and Oldsmobile cars.

These tops are strongly constructed throughout, being built of selected hard wood stock, reinforced with steel. This frame is then covered with a high grade luster lasting water proof material and the interior is attractively lined in a soft gray cloth. All windows are of extra heavy crystal glass. Doors are so arranged that they open and close with the regular body doors of the car (except Fords). Windows of doors are provided with drop glass panes, which may be raised or lowered as desired, thus insuring ample ventilation at all times. Anchor tops fit snugly to the regular body of the car, with no overhang or unsightly attachments of any kind. All tops are shipped in such a

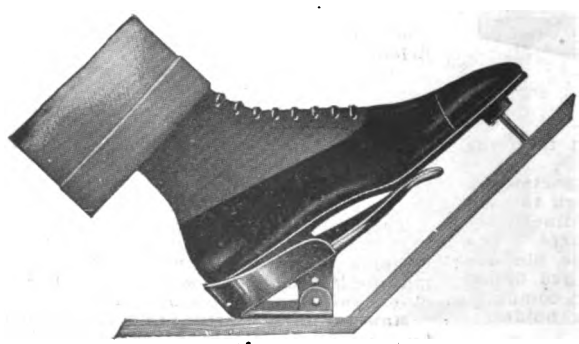


manner that it is a very easy matter to install them on cars satisfactorily. All necessary attachments are furnished and as tops fit to regular body irons of car and are held there firmly by means of special irons, no difficulty should be experienced in getting tops on properly. Complete instructions are furnished and each iron is plainly marked where it is intended to be used. A large stock of all models are carried at factory for immediate shipments. However, in order to avoid delay in transportation dealers are advised to place orders early.

Manufactured by the Anchor Top and Body Co., Cincinnati, O. Price quoted at request.

G. A. C. Accelerator Foot Rest. Every driver of an automobile equipped with a foot accelerator realizes the importance of foot stability as effecting the car movement. With the foot supported upon the heel only, every jolt and jar of the car means a sudden acceleration or retardation of the speed and attendant strain upon the engine. The G. A. C. accelerator foot rest is a device that has been designed to relieve the foot and leg strain by carrying the weight of the foot in a specially designed rest, which is so arranged that the accelerator pedal may be held in practically any position with a minimum amount of effort. With this device, which is ornamental in effect, unsightly holes in the car matting, as well as shoe wear, is prevented.

Manufactured by the General Appliance Co., 127 Federal St., Boston, Mass. Price, $1.50.





The Masters Gasoline Meter is a round device 2½ inches in diameter with a row of figures which indicate the gasoline consumption in gallons and tenths. Reading the instrument is like reading an odometer. This meter can be used on any car equipped with a vacuum feed tank and the operation is such that each cycle of operation draws in and discharges a certain amount of fuel. It is connected through a small copper tube to the vacuum tank. Every time the tank is filled and emptied an impulse is sent to the meter and these impulses are deducted into terms of gallons and tenths and indicated on the face of the meter. Floats, cords, pulleys and such devices are not used in this instrument and it is one of the most practical and simple recording devices yet invented.

Manufactured by Irvin W. Masters, Muncie, Ind. Price, $8.

Lawco Silencer. A muffler which is said to eliminate back pressure and loss of power is now being put on the market under the name of Lawco Silencer. This silencer is designed for use upon any of



the cars upon the market and comes complete with hangers and fittings ready for application.

Manufactured by the F. H. Lawson Co., Cincinnati, O. Price for Ford attachment, $2.50.

Portable Grease Cabinets and Pumps will handle oils and semi-fluid greases and also the heaviest transmission greases. The container is a painted heavy tin can of 20 pounds capacity, with handle and dust proof cover, provided with a nozzle hose. The valve castings have large grease openings, controlled by a single ball valve, assuring simplicity and strength. A baffle washer inside the container keeps the air from the pumps so that practically all the grease can be pumped out. The containers having 8½-inch openings can easily be filled.

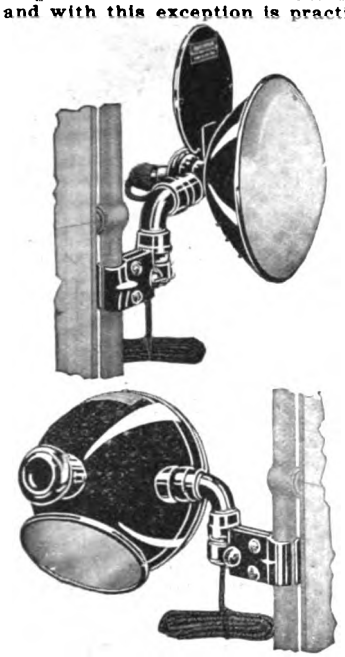
Manufactured by the Midway Mechanical Co., 1555 Selby Ave., St. Paul, Minn. Price quoted at request.



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Howe Spotlights. Two popular priced spotlight models, embodying the famous patented Howe principles, have been added to the Howe line. The No. 5 models of the double shell type, are torpedo shaped, with baked on enamel finish. It is fitted with a four-inch rear view mirror, an on-and-off switch in the handle, and the patented spring controlled Howe bracket, which permits instant turning at practically any angle, the spring holding the lamp firmly in any position. With this type, as with all models, clamps are furnished in seven styles to fit each and every windshield frame.

The light measures six inches across the face and with this exception is practically



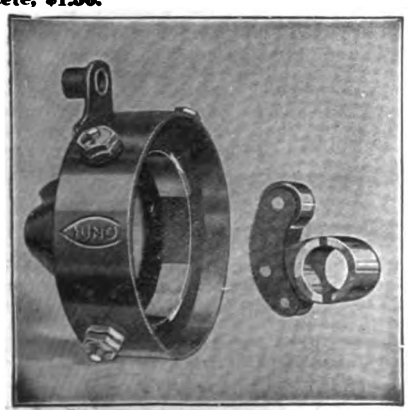
the same type as the old model nine.

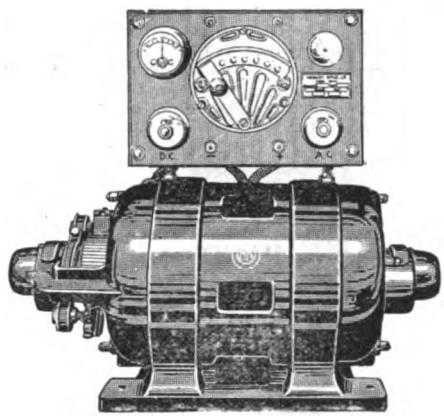
The Howe Junior No. 15 is a single shell spotlight of very sturdy construction. It is fitted with a convex lens, four-inch rear view mirror, an on-and-off connector switch and the standard spring bracket. It is finished in baked on enamel and is very attractive in design.

Manufactured by the Howe Manufacturing Co., 1732 S. Michigan Ave., Chicago, Ill. Price for No. 5, $5.50; Howe Junior No. 15, $4.

The Cuno Timer is designed to meet the demand for a high class, well built timer for replacement on Ford cars. It is made of light weight steel and is practically indestructible. It is finished in black enamel. The construction is such that it can be attached to any model T Ford car without any change. Constant lubrication is affected by splash from an oil well formed by the groove behind the fiber ring, which is filled occasionally through the oiler. The roller assembly is light, simple and strong. The roller and pin are made of special steel and are hardened.

Manufactured by the Cuno Engineering Corporation, Meriden, Conn. Price complete, $1.50.





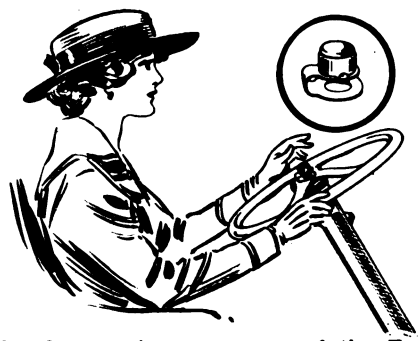
The HB Battery Charging Set is a compact and efficient arrangement of a motor operating from a direct or alternating city current, mounted on the same shaft with a generator specially designed for charging auto starting and lighting batteries. Ball bearings support the motor generator shaft at each end.

The charging system is complete with switchboard and ready to operate by connecting the city current to the upper binding posts. After making these connections the switch at the right controls the motor. The current for charging is delivered through the lower binding posts and is controlled by the switch on the left. This current may be regulated by moving the handle of the rheostat in the middle of the board. An ammeter shows the flow of current through the battery terminals.

Automatic voltage control in the generator permits the charging of different voltage batteries at the same time. If batteries are connected up wrong, the negative pole of the battery to the positive terminal of the machine, the generator will protect the batteries by reversing its polarity.

Manufactured by Hobart Bros. Co., Troy, O. Price, $150.

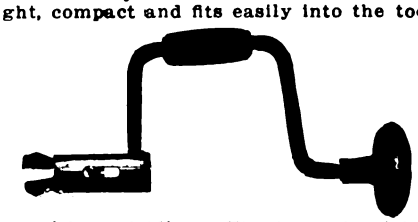
Handy Push Button. To be effectual an automobile warning signal must be so placed as to be effectual at a moment's notice. The Handy horn push button is designed with a holder so that it may be



placed over the center nut of the Ford steering wheel and wired to the regular Ford button equipment. When this is done the movement of one hand seven inches is sufficient to reach the button and sound the horn.

Manufactured by the Francis-Rand Co., Cleveland, O. Price, 75 cents.

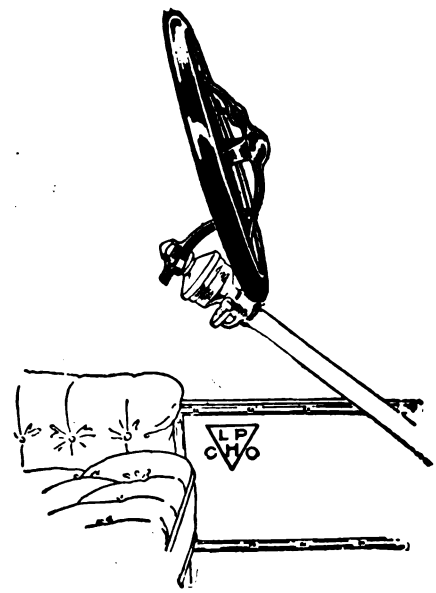
The Utility Universal Rim Wrench is light, compact and fits easily into the tool



box without folding. The brace is nickel plated, the tube contains jaws finished in black enamel and the handle corresponds.

Manufactured by the Hill Pump Valve Co., Chicago, Ill. Price, $1.50.

Halladay Steering Wheel. There is a demand for an adjustable steering wheel for Ford cars for two reasons. First, because such a device permits access to the driver's seat without disturbing the occupant of the other seat; second, because steering is made easier by means of a larger diameter wheel or by corrugations on the wheel rim. The Halladay adjustable steering wheel is attached to the Ford

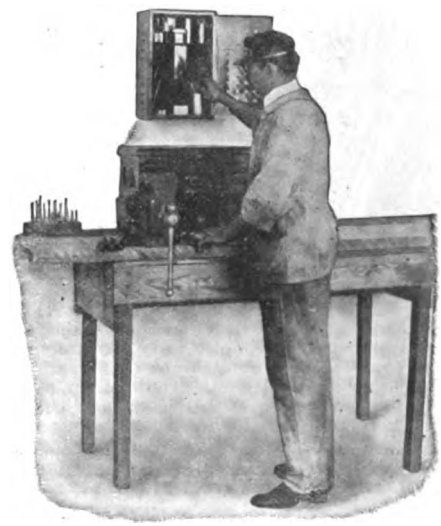


car steering column by the removal of one nut and the steering wheel, and when in place may be folded back by the releasing of a catch on the underneath side. The wheel may be obtained in either of two sizes, 15 or 17 inch, and has either a plain or corrugated rim.

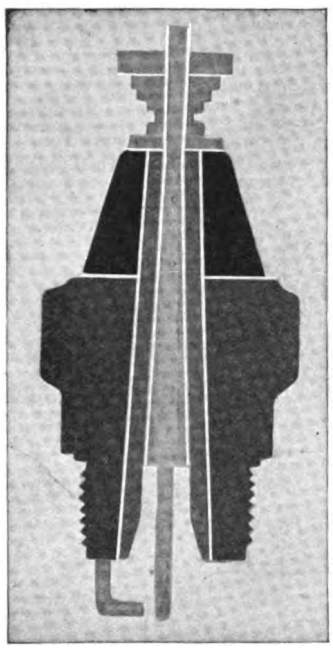
Manufactured by L. P. Halladay Co., Streator, Ill. Price quoted at request.

Tool Cabinet. In every garage and repair shop many valuable tools are mislaid or lost. The H. & H. tool cabinet provides a safe place where such tools may be kept under lock and key. The workman's time is not wasted searching for tools which have been left on the bench for lack of place to put them when not in use. These cabinets are made of cold rolled sheet steel and when ordered in quantities can be made with any desired arrangement of partitions or shelves. They are arranged for use with a padlock and fitted with spring hinges, which keep the door closed at all times. The finish is either black or olive green enamel, baked on. Stock size is seven inches deep, 12 inches wide and 18½ inches high.

Manufactured by the Hart & Hutchinson Co., New Britain, Conn. Price quoted at request.



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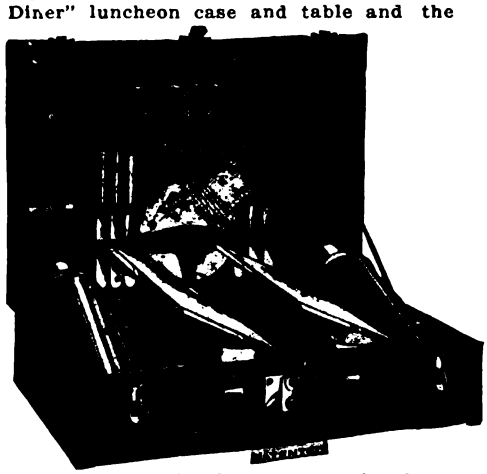


"The Answer to Spark Plug Troubles" is the advertising slogan used with the Answer Spark Plug, a cross section cut of which appears herewith. The Answer plug is made up as follows: A special steel spindle larger at the bottom than at the top is covered by a layer of mica insulation which, owing to the construction, is at all times under a pressure. The spindle with the mica insulation, which is 3/32 inch thick, fits into the base of the plug, the top of which is made up of mica insulation compressed and polished. The electrodes are guaranteed not to burn or fuse.

Manufactured by the Hilborn Co., Inc., 535 Canal St., New York, N. Y. Regular sizes, $1. Ford special, 75 cents.

The Knickerbocker "Made Right" Motor Luncheon Outfit, as illustrated, is combined luncheon and suit case arranged, so that the entire equipment may be removed and the case used as an ordinary suit case when desired. This style is made in three sizes, suitable and equipped as desired for two, four, six or seven persons, and are furnished complete with cutlery and dishes or with just food boxes as desired.

In addition the Knickerbocker "Pullman Diner" luncheon case and table and the



Convertible Auto Refrigerator luncheon case and trunk are popular styles, offering most practical and convenient features. All cases have compartments provided for carrying two or more of any standard thermos or vacuum bottles or jars.

Manufactured by the Knickerbocker Case Co., Fulton and Clinton Sts., Chicago, Ill. Prices range from $13 to $42.50.

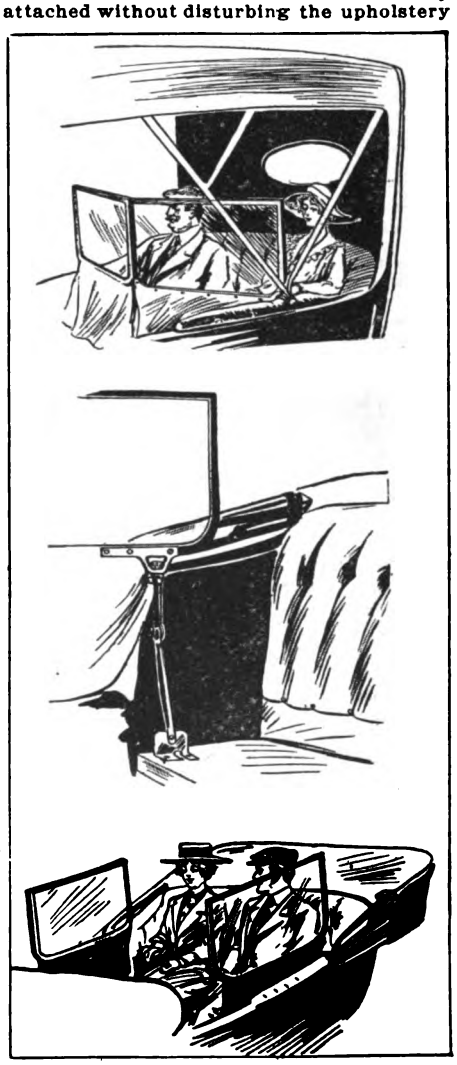
The Handy Terminal is for use on practically any type of cable connection, and is connected without soldering. The ferrule is fitted to the cable and the stripped wire firmly held by a copper clip, which is claimed not to work loose. The jaws of the device are threaded on the inside and engage the threads or the spark plug



center bolt. One motion raises the ring, compresses the steel spring, releases the terminal and lifts it from the bolt.

Manufactured by the Francis-Rand Co., 400-401 Erie Bldg., Cleveland, O. Price, 25 cents each.

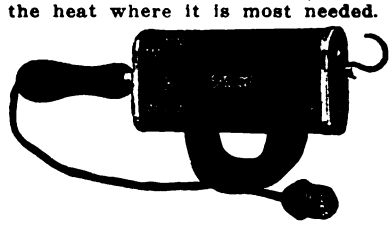
The Clark Tonneau Windshield eliminates the strong wind pressure and the clouds of dust which often envelop those on the rear seat. The windshield is easily attached without disturbing the upholstery



on the car. When it is not in use it is turned back out of the way, but can be brought into service by a slight pull.

Manufactured by A. N. Clark & Son, Plainville, Conn. Price quoted at request.

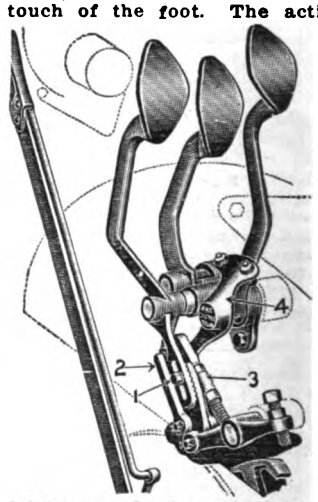
Presto Electric Heater. A new accessory which has just been put on the market should be of great interest to motorists who plan to run their car during the winter months, yet are unable to afford a heated garage. This device is an electrical engine heater called the Presto and operates upon ordinary electric house current. It measures 12 inches in length and is designed to hang under the hood, near the carburetor or radiator, distributing the heat where it is most needed. With



the heater is furnished 10 feet of cord and an attachment plug for any electric light socket. It may be used on 110 volt current, either direct or alternating. The manufacturers claim a very low cost per hour operating this attachment and say that with it the engine is kept to an operating temperature, regardless of outside temperatures.

Manufactured by Metal Specialties Mfg. Co., 338-352 N. Kedzie Ave., Chicago, Ill. Price quoted at request.

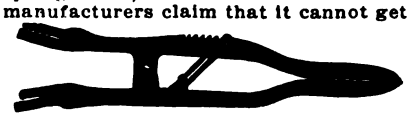
Automatic Simplifier. A new device for simplifying the driving of the Ford car is being placed upon the market. By its use full control of the car is through but one pedal. The action is entirely automatic and the engine cannot be "killed" by quick application of the service brake. As the brake pedal is pushed forward the high speed is automatically released and held in neutral position until released by a slight touch of the foot. The action of



low and high speeds through the pedal is not changed, but immediately the brake is applied a neutral speed position is obtained. The emergency brake need not be used except as an additional precautionary measure. The reverse is obtained as usual, but with the attachment, it is unnecessary to hold the clutch pedal at neutral. The device is easily and quickly installed on any Ford car without drilling any holes.

Manufactured by Marion Metal Products Co., Marion, Ind. Price, $5.

Auburn Valve Lifters. This is a so-called one-piece, self-adjusting valve spring lifter, made of malleable iron. The manufacturers claim that it cannot get out

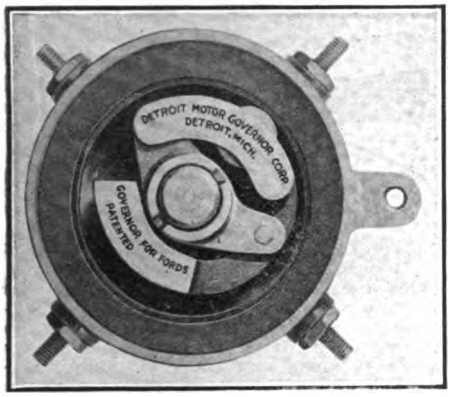


of order, as it has no hooks, springs or chains, and no separate pieces to become lost. It is made to fit all cars and is finished in black.

Manufactured by Auburn Ignition Mfg. Co., Auburn, N. Y. Price, 75 cents.

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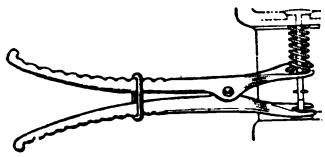
The Detroit Motor Governor governs the speed of the Ford engine. It takes the place of the roller or brush in the Ford timer case, where it performs both the function of the brush and a speed regulator. It does not alter the mechanism, but automatically cuts out the distributor by centrifugal action if the engine is running



in excess of 1400 to 1600 revolutions per minute. As the engine is slowed the governor releases the brush and it starts to work automatically.

Marketed by the Forthe Detroit Motor Governor Co., Detroit, Mich. Price, $5.

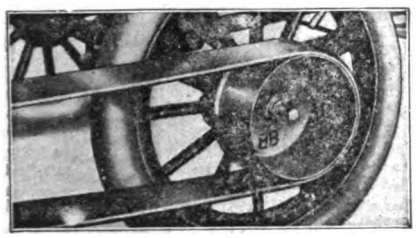
Best Valve Lifter. We illustrate here a handy, malleable iron, valve lifter, which the makers claim to be one of the best on



the market. The holding ring is slipped up and down the handle for adjustments.

Manufactured by Fish-Best Co., Grand Rapids, Mich. Price, 50 cents.

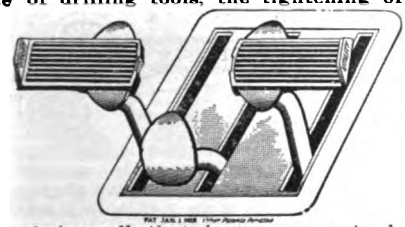
The Bayne "B B" Auto Power Pulley is an ordinary five-inch crown face belt pulley 10 inches in diameter, correctly designed, so that it can be attached to either rear wheel of an automobile by simply unscrewing and replacing the hub cap,



and when so attached is a perfect belt power pulley for transmitting power to any belt driven machinery.

Manufactured by the Bayne Manufacturing Co., Bushnell, Ill. Price, $5.65.

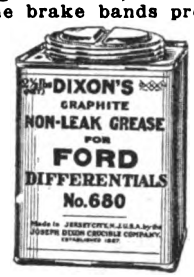
Utility Sure Grip Pedals for Fords are made of pressed steel finished in black enamel and are equipped with heavy pads of rubber edged with metal. They are easily and instantly attached without the use of drilling tools, the tightening of a



nut being all that is necessary to hold them securely in place.

Manufactured by the Hill Pump Valve Co., Archer Ave. and Canal Sts., Chicago, Ill. Price, $1 per pair.

Dixon's Non-Leak Grease No. 680 solves the problem of grease exuding from the rear axle to the brake bands and wheels of the car. Excess grease not only detracts from the appearance, but also produces a danger element, in that the lubrication of the brake bands prevents their

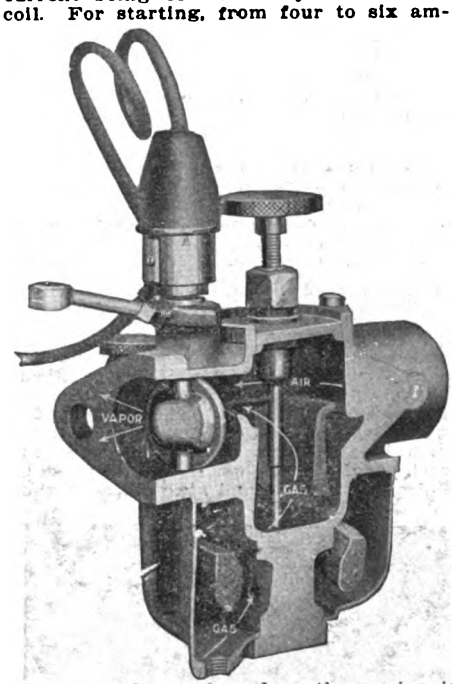


proper functioning. It is composed of selected flake graphite, thoroughly mixed with a special adhesive lubricant.

Manufactured by Joseph Dixon Crucible Co., Jersey City, N. J. Price quoted at request.

Electrically Heated Valve. The proper application of heat to the gasoline as it leaves the carburetor is said by engineers to be the easier solution of the hard starting problem, which is greater at the present time than ever before on account of the low grade fuel.

The Electrically Heated Throttle Valve is designed to heat the mixture of gasoline and air as it leaves the carburetor. As it passes from the carburetor into the manifold it comes in contact with the throttle valve, which is electrically heated, the current being controlled by a resistance coil. For starting, from four to six am-



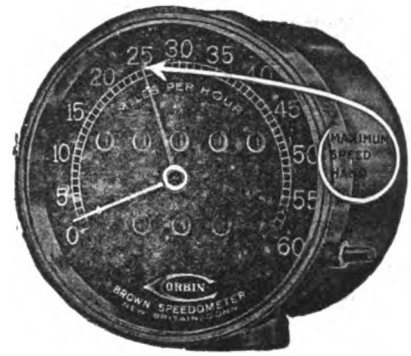
peres may be used, and as the engine is warmed the current may be cut to from two to three amperes.

This device may be used on practically any car and run on either storage battery or dry cells.

Manufactured by Jones Electric Machine Works, 1319 Fletcher Savings and Trust Bldg., Indianapolis, Ind. Price $3.75 for Fords.

Corbin-Brown Speedometers are made for automobiles, motor trucks and motorcycles, and in special models for Ford cars, operate on the centrifugal principle, and thus are not affected by extreme temperatures or by electrical influence. Quick jumps or slumps of the thermometer do not disturb the Corbin-Brown reliability, nor is the instrument affected by the electrical influence exerted through an electric lighting system or an electric self-starter on a car.

The drive gears and shaft are in one piece for greater strength and accuracy. The cable is of the exclusive link type, which gives maximum strength and practically eliminates friction in the casing. It is almost unbreakable, but if a repair should be found necessary a new link can



be easily inserted by anyone. While this cable is strongly recommended by the Corbin company, the flexible shaft type can be supplied instead if desired.

One of the most valuable exclusive features of the speedometers is the maximum speed hand. This hand, fitted as an extra, registers the highest speed attained by the car and remains at that point until reset at zero. This can be done in an instant at any time.

The maximum speed hand does away with the annoyance and risk of watching the speedometer to keep track of speed while traveling at a fast pace. The record of highest speed remains as long as wanted.

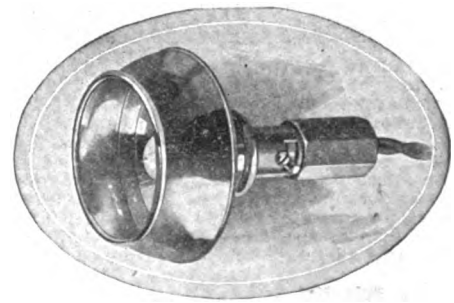
For use on motor trucks, the maximum speed hand can be supplied with locking arrangement to prevent resetting by the truck operator. It thus acts as a reliable check on overfast driving, as the speed record remains for inspection by the employer. It cuts repair bills, eliminates accidents and adds to the life of the truck.

The special models for Ford cars can be supplied complete with handsome cowl board, or simply with a neat bracket for attaching to the dash.

The Corbin company has an interesting illustrated catalogue, dealing in full with the attractive features of its speedometer line, which will be sent upon request.

Manufactured by the Corbin Screw Corporation, New Britain, Conn. Price quoted at request.

The Cellbeam Concealed Spot Lamp is a radical departure from conventional types of spot lamps in that instead of being used clamped to the windshield it is carried in the hand and attached with a clip to the dash or instrument board. The device projects a concentrated beam which extends 500 feet in a straight line and a



diffused glow which illuminates nearby objects at a greater angle. It is fitted with a six-volt nitrogen bulb, 30 candle power, and silvered reflectors. The exterior is finished in polished nickel and the handle is fitted with the focussing adjustment. With the device is furnished five feet of flexible cord, which is connected with the battery in the usual manner, making an excellent "trouble lamp."

Manufactured by Cellbeam Corporation, 501 Fifth Ave., New York City. Price, $5.

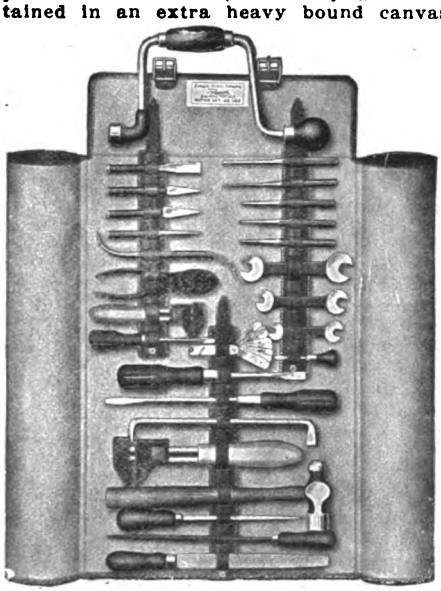
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The B-W Ammeter has a case of drawn brass finished in either bright nickel or black rubberoid. It is supplied in either surface or flush types. The glass is held in place with a special baked cement, which makes it waterproof, and is further reinforced with a wire locking ring, which eliminates any chance of the glass working loose. The movement is said to be practically vibrationless, that is, not affected by engine or rough road jars. It is of the permanent magnet iron vane type and is not affected by short circuits. The scale is of the usual etched type and several different finishes are optional.

Manufactured by Ballman-Whitten Manufacturing Co., 4440 Olive St, St. Louis, Mo. Price quoted at request.

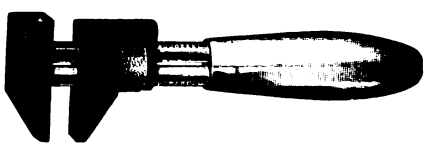
The Motor Set is a handy tool kit, holding tools for making ordinary road repairs on an automobile. They are contained in an extra heavy bound canvas



roll and are held in place by long leather straps.

Manufactured by Goodell-Pratt Co., Greenfield, Mass. Price, $18.

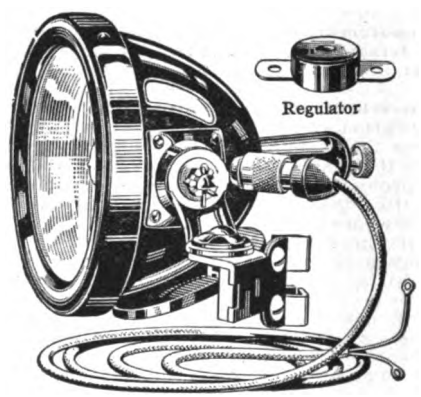
An Adjustable Wrench is shown of a somewhat different design from the ordinary wrench in that the adjustable jaw slides on two steel guide rods, which are cast into a polished aluminum handle. The jaws are made of case hardened steel



and the adjusting nut of the small size wrench is made in two sizes, six and 10-inch.

Manufactured by Goodell-Pratt Co., Greenfield, Mass. Price on large size, $2; on small size, $1.

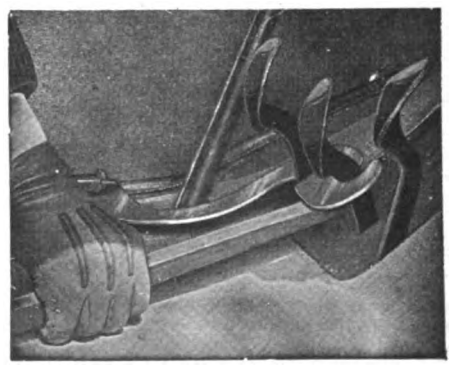
Dynolite, a high grade spotlight, designed especially for Ford cars, and of the true parabolic type, is the new member of Vernal Products family, which includes Genolite and Constolite, a starting and lighting system for Fords, that has been sold in large volume. Dynolite throws a brilliant light more than 2000 feet ahead of the car and it can be focussed instantly to comply with any anti-glare regulations. The maker claims it is the first and only practical windshield spotlight that has ever been built exclusively for use on Ford cars, and that it possesses several patented features that cannot be found in other lamps. It can be focussed without the use of tools; the current can be turned off or on instantly by means of a foolproof switch in the handle; it has a waterproof swivel joint; has a bracket that fits all Ford cars; has interchangeable parts and has bayonet locks to secure door



and reflector and lens. Dynolite operates off the magneto and uses a six-volt, 24 candlepower bulb. It gives almost full power at low speeds, and maximum light at speeds above nine miles per horsepower. Integral with the body is a mirrorscope, providing a view of traffic behind or beside the driver. The foregoing gives some of the features of the lamp and the maker's free literature amplifies the information.

Manufactured by the Detroit Starter Co., Detroit, Mich. Price quoted at request.

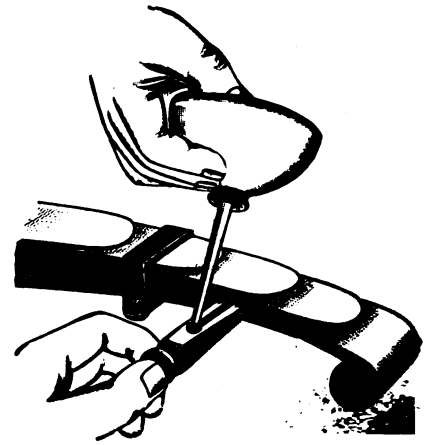
Essansee Lock. A simple little device designed to make the locking of a Ford car a practical matter is illustrated herewith, and called the Essansee Lock. This device consists of an S shaped steel fitting, which is placed around the high speed clutch pedal and against the reverse pedal, holding the reverse and high gears in and



making the removal of the car practically impossible. The device is locked into place back of the emergency brake lever.

It is said that the device is as strongly made as are the pedals, so that even if a crow bar were used to pry the device from its place the pedals would be broken before the device itself.

Manufactured by Essansee Lock Co., Land Title Bldg., Philadelphia, Pa. Price quoted at request.



The Cochran Spring Oiler affords an easy and simple method of getting oil between the springs of the car. To use the car weight is lifted from the springs by means of jacks and the oiler simply inserted between the spring leaves and the oil squirted into the groove of the oiler, from which it flows to the lubricating points.

Manufactured by the Cochran Pipe Wrench Mfg. Co., 7800 Woodlawn Ave., Chicago, Ill. Price quoted at request.

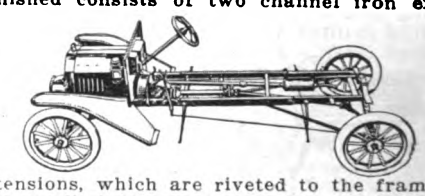
Ezy-Out Screw Extractor Sets, as the name implies, are designed for the extraction of broken screws, studs and other parts which are held in place by threads and which have their heads broken off so that the screw driver or wrench cannot be used in removing them. As the accompanying illustration shows these tools en-



able one to do a quick, clean job without loss of time or temper, as it is only necessary to drill a hole in the broken piece, insert the "Ezy-Out" tool and the broken section can be unscrewed on its own threads without endangering the threads in the original hole.

Manufactured by the Cleveland Twist Drill Co., Cleveland; O. Prices quoted at request.

The Greb Extension. The demand for truck delivery exists in practically every part of this country, and is constantly growing. The Greb Extension is designed to lengthen a Ford car to 115 or 130-inch wheelbase, thus making that pleasure car into an economical and efficient 1000-pound delivery truck. The equipment as furnished consists of two channel iron ex-

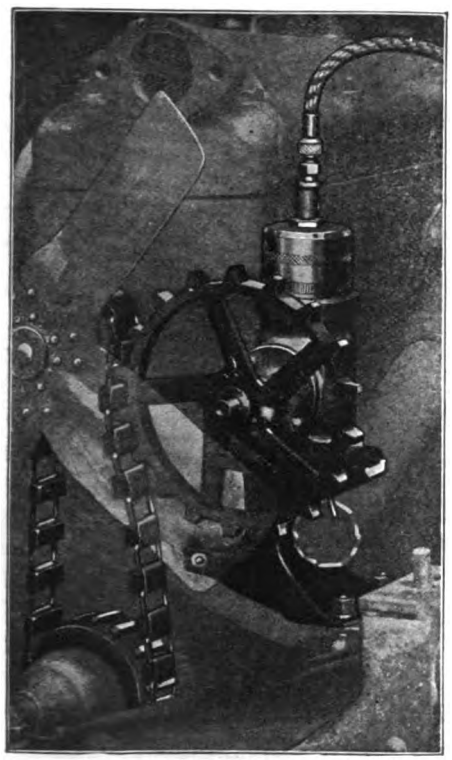


tensions, which are riveted to the frame, thus eliminating any possible chance of breakage. A universal and drive shaft assembly, all bolts, screws, rivets, lock washers and nuts complete with full directions.

Manufactured by the Greb Co., 202 State St., Boston, Mass. Price for 115-inch extension, $55; for 130-inch extension, $60.

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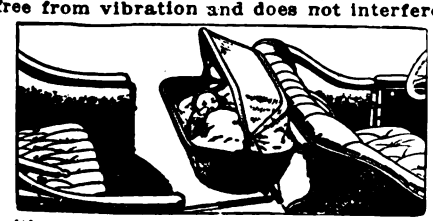
The Crane Power Tire Pump and the Crowe Mechanical Fan Belt make a successful application of a power tire pump to the Ford car. The power is taken from the shaft of the engine. The Crowe Fan Belt consists of a steel chain into which blocks of oak tanned sole leather are firmly embedded. When used with the Crane Pump the belt serves a double purpose. In turning the fan it acts as a friction belt, as the fan pulleys come in contact with the leather only. The belt is engaged with the pump sprocket only when the pump is in operation, acting then as a silent chain and insuring a positive drive. Instead of being set into the moving piston, the Crane packing ring is stationary and the piston



moves through it. By slightly turning the cylinder, which is threaded into the crank case, the ring is compressed (being of patented design and special alloy) so that it hugs the piston more closely; thus the adjustment is variable to compensate for any wear and the compression is increased at will. This adjustment can be made while the pump is in operation. The pump, bracket, 13 feet of pressure hose with gauge, bolts, nuts and driving parts, together with the fan belt, are sold complete ready for installation.

Manufactured by the Bay State Pump Co., 100 Purchase St., Boston, Mass. Price, $12.

The Gordon Motor Crib is easily strapped to the back of the front seat and is held in an open position by a spring connection to the floor or back seat with an adjustable strap. When thus suspended it is free from vibration and does not interfere



with entrance into the tonneau. An adjustable hood protects baby from the sun or wind and the crib is easily folded against the back of the seat when not in use.

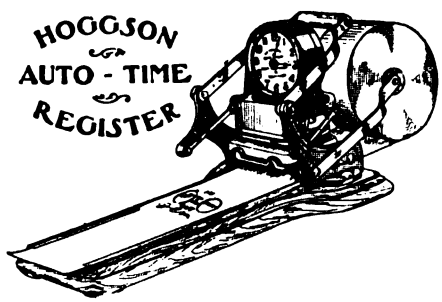
Manufactured by the Gordon Motor Crib Co., 27 South Water St., Chicago, Ill. Price, $10.



Friestedt Hydronizer. More miles per gallon of fuel, carbon not only prevented, but removed, clean spark plugs and a smoother running engine are some of the outstanding features claimed for this device. It operates automatically, from the moment the engine is started until it is stopped. Air is drawn in through the top of the device and thence through the water in the reservoir. In passing through the liquid the air is saturated with water and is drawn into the engine through the manifold connection in the form of water vapor.

Manufactured by Friestedt Manufacturing Co., 2934-38 W. Lake St., Chicago, Ill. Price complete as illustrated, $6.50.

The Hoggson Auto-Time Register is designed to fill the requirements of the small shop employing only a few men. This machine not only records the "In" and "Out" of employees, but also "Sales Made," "Goods Received" or "Delivered;" in fact, everything coming to or going by the person in charge. The record is made on a paper strip from the roll attached to the back of the machine, which feeds through



a guide. By the aid of suitable slips or cards it will time job work, cost of manufacture, etc., without any interference with the paper roll. It is self-inking and prints clear and distinct the year, month, day, hour, minute.

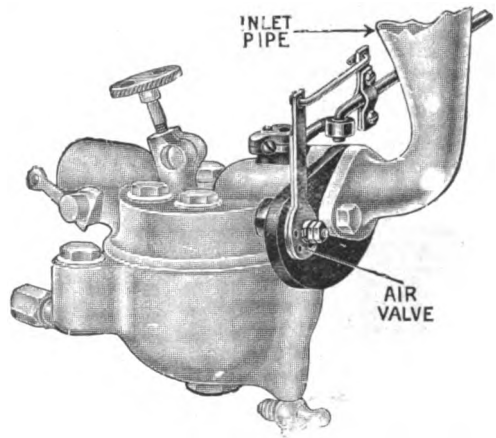
Manufactured by S. H. Hoggson & Co., 27 Thames St., New York City, N. Y. Price, $25 complete.

The Circular Glass Cutter shown in the illustration has a graduated beam that can be quickly and firmly set to cut circles of any size from two to 12 inches in diameter. Each of the cutters is provided with a high grade cutter wheel which has been carefully honed and tested by actual cutting before being mounted in the tool. The standard is equipped with a rubber base to prevent slipping.

Manufactured by Goodell-Pratt Co., Greenfield, Mass. Price, 70 cents.



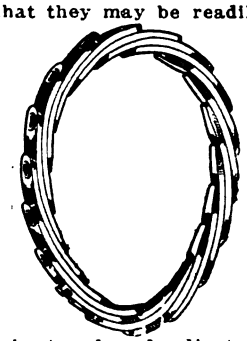
Gasco Economizer. Proper vaporization of fuel is a problem that is facing every automobile owner today. To get full power from an engine the mixing of gasoline and air in the proper proportions is necessary. The makers of the Gasco economizer claim that this device promotes vaporization, prevents back fire into carburetor and reduces carbon depositization. The Gasco economizer is a device which is attached to the intake manifold, between that part and the carburetor. It consists of three screens of copper gauze, in a cone shaped arrangement, one within the other. It is said that the gas mixture passing through the screen is thoroughly broken



up, forming a fine vapor, which materially lessens the difficulty of starting the engine. A 30-day trial of the device is allowed and if not satisfactory it may be returned and money will be refunded.

Manufactured by the Gasket Supply Co., 18th and Ludlow Sts., Philadelphia, Pa.

Flexo Laminated Belts are made in sections cut from solid back belting hides, assembled with steel copper plated rivets and fastened with machine screws and nuts so that they may be readily length-



ened or shortened and adjusted. These belts may be obtained in widths from ⅝ to 1⅛ inches, and lengths as desired, endless or in rolls of 50 feet, with sufficient rivets and burrs or bolts and nuts for making them endless.

Manufactured by Detroit Leather Works, Detroit, Mich. Prices upon request.

Glare-Off Headlights are placed inside the ordinary automobile lamp and are designed to throw the light downward and forward onto the road. They are made of metal and are ornamental as well as use-



ful. The designs are worked out in a rich red, gold and black, and have the appearance of old Japanese lacquer and are to be had in a number of patterns.

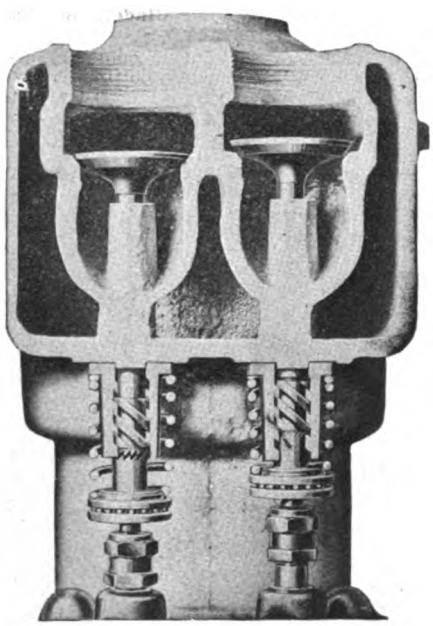
Made by the Glare-Off Co., 1777 Broadway, N. Y. Special monogram or initials furnished. Prices quoted at request.

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Ceco Valve Rotator. Distorted valve stems, unevenly worn and pitted valve faces are three engine evils that make for loss of power and unsatisfactory action. The Ceco valve rotator is an ingenious device, for automatically rotating the valves of an engine, a small portion of a revolution, so that at every up and down motion the valve is seated in a different location.

The device consists of three main parts, A which forms the outside of the rotating member, made of bronze and fastened to the engine cylinder; B, the rotating member which fits into A, and slides upon the valve stem against a small but sharply defined shoulder; and C, which is fastened or locked to the stem and carries a ball thrust bearing for permitting the valve to turn freely against the resisting action of the spring. B and C have ratchet like projections, which prevent backlash. As the valve is lifted by the tappet the worm like fitting B is turned in the sleeve A, carrying with it the fitting C and turning



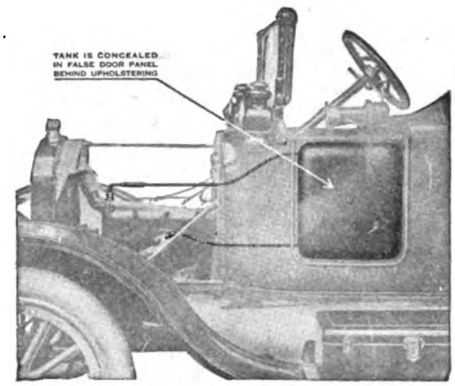


the valve a small way. At the top of the lift, and at the beginning of the down stroke the fitting C is separated from B, allowing B to return to its original position without carrying C back. B is carried downward by the spring pressure acting through the shoulder of the valve stem.

It is said that valve action is not hampered in any way, nor is there any attendant noise due to the valve rotator. The device is made in a number of sizes to meet the requirements of the valve assembly of practically any engine of standard make.

Manufactured by Continental Engineering Corporation, Omaha, Neb. Prices quoted at request.

The Thermomat. With a car cooled by the thermo-syphon system the efficiency of the system is dependent upon proper circulation. Should steam pressure develop, the efficiency is materially decreased at times and the temperature of the engine immediately increases, often with disastrous results. The Thermomat is said to eliminate any possible chance for steam pressure to develop. It consists of a tank or vacuum chamber designed to be attached in the fore door of the car, with two pipes to connect it with the engine water circuit. The upper tube leads from

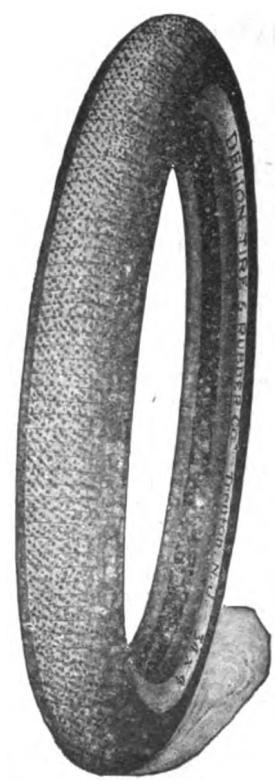


the engine water outlet through the dash into the top of the vacuum condenser tank. The lower tube passes from the water space or bottom of the vacuum tank through the floor board to the engine water inlet elbow. The position of the tank is such that when the radiator is full the tank is a little over half full of water. As long as the engine is cool the condenser does not operate, but when the water begins to boil the condenser takes up its work and operates as fast as steam is generated.

Manufactured by the Cawle Co., 506 City Trust Bldg., Indianapolis, Ind. Price, $12.50.

Delion Cord Tread Tires are a new kind of pneumatic tire which is guaranteed to be permanently non-skid and adjustable on the basis of 7500 miles of service, tread being composed of a combination of rubber stock and fabric, with the fabric standing on edge so as to come constantly in contact with the road surface. This feature gives the tire its non-skid qualities. The tread construction of the tire is entirely different from any other, for the fabric is impregnated with rubber under a new process by which the rubber is drawn into the fabric by suction instead of forced in by pressure. Thus the bond between the rubber and fabric is claimed to be much closer than by the other process.

Manufactured by the Delion Tire and Rubber Co., Trenton, N. J. Price quoted at request.



The B.-W. Magneto Tester makes it possible to test Ford magnetos without removing the magneto from the engine and it constantly checks up and indicates any trouble. The tester consists of a reactance coil and an alternating current ammeter, all mounted in a neat wooden case. The scale of the tester is calibrated to show the proper strength of Ford magneto upon any model. The tester serves its greatest purpose when the engine is on the bench. It enables one to get the magneto perfect before reassembling the engine in the chassis. This is done by grounding one of the leads of the tester to the engine and holding the other lead to the contact of the coil frame with the fingers. The other hand revolves the flywheel. This can be done fast enough so that the tester will give a steady, accurate reading. Other tests can be made quickly and accurately by running the en-



gine at any moderate speed, without disassembling, and the tester will indicate the exact condition of the magneto.

Manufactured by the Ballman-Whitten Manufacturing Co., 4440 Olive St., St. Louis, Mo. Price, $10.

The Carborundum Co., Niagara Falls, N. Y., is marketing their Carbo valve grinding compound in a new combination, flat, oblong can, four inches long, two inches wide and one inch high, as shown in the illustration. This can is arranged to con-



tain fine and coarse compound, two ounces of each, and the tin partition in the center keeps the two grades separate. It is a very convenient package, both from the shipping and stocking standpoint, as well as for the user, who will always find it right side up.

Manufactured and distributed by the Carborundum Co., Niagara Falls, N. Y. Prices quoted at request.

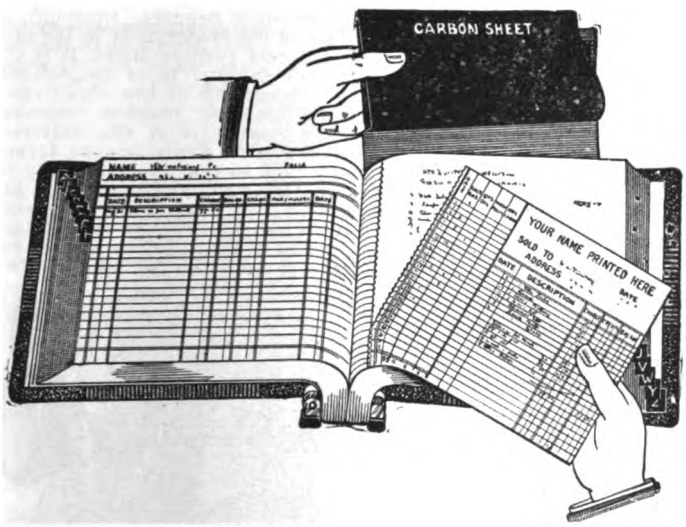
Curtain Light. The Gordon Curtain Light is equipped with special fasteners



for applying it to the curtain on the back of the Ford car should it become broken. It is not necessary to take the rear curtain off when this light is used.

Made by the J. P. Gordon Co., Columbus, O. Price, 80 cents.

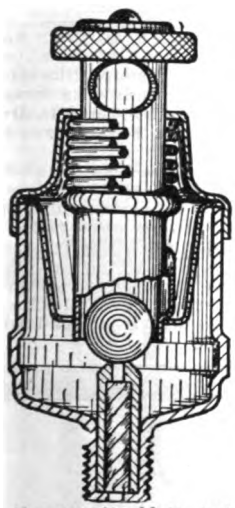
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Garage Bookkeeping. Though many garage owners make every effort to install the most efficient machinery in the work rooms and to further the standard of workmanship without increasing the cost, many others fail to realize the value of an efficient and up-to-date accounting system. The bookkeeping question is just as important a part of the business as is the shop. Without it the profit is sure to decrease and the owner is unable to quote prices with any basis for computation. Illustrated herewith is a garage bookkeeping outfit designed for garage keepers. This system is said to be complete in every detail and is the result of much careful study by specialists in that line. The publishers make a specialty of systems for garages and repair shops and gladly give advice free. The value of such service may be appreciated by such garage owners as require a simple but efficient check upon the business.

The Thomas J. Harton & Co., Inc, Church and Worth Sts., New York. Price quoted at request.

The Consol Automatic Oiler, which is automatic in operation and dirt proof, has many distinct features, fully protected by patents not heretofore used in any oiler. It is neatly made and comes in several styles and finishes. It absolutely prevents leakage of oil onto the bearing when the car is not in motion, for it takes the vi-

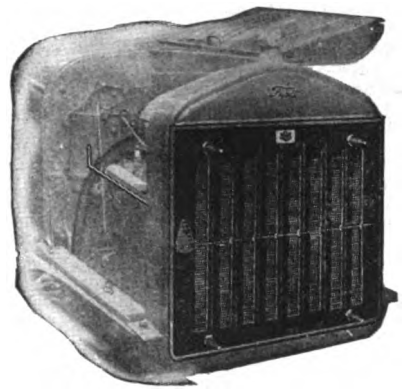


bration of the car itself to upset a little ball valve which automatically controls the flow of oil from the cup. Already several automobile manufacturers have placed orders for these oilers, recognizing in same a distinct improvement over other oilers. The company is just starting the production on a large scale.

Manufactured by the Consolidated Machine Co., Detroit, Mich. Price quoted at request.



H-M Metal Radiator Cover. A handy device for the winter motorist is illustrated herewith and called the H-M Metal Radiator Cover. This device is made of sheet metal divided into eight adjustable shutters operated as one from the dashboard. It is attached to the radiator with springs, assuring a tight and non-rattling fit at all times. The cover may be entirely closed, half, three-quarter, quarter



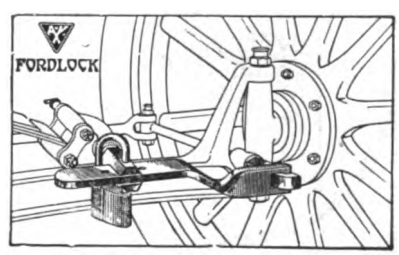
closed or entirely open, depending upon weather conditions.

It is said that it is staunchly constructed and may be used many seasons.

Manufactured by the H-M Manufacturing Co., Indianapolis, Ind. Price quoted at request.

A-Y Fordlock. The illustration shows the A-Y Fordlock as it is applied to a Ford car. This locking arrangement is applied to the steering spindle and front axle of the car, and when locked into place keeps the wheels in one of three positions: Straight ahead, as shown, at the left, or at the right. The locking rod is made of heavy steel; the padlock itself of standard design. Though it would be nearly impossible, and very impractical, to tow the car any distance without removing the lock, it could easily be moved a short distance in case of fire, or to relieve traffic congestion.

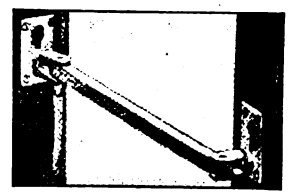
Manufactured by Angsten-Koch Co., Princeton Ave., Chicago, Ill. Price complete with Corbin lock, $3.50.



Master Calorite Spark Plugs involve the discovery of the new insulating material known as Calorite, and its adoption in the Master plug, the makers claim, has revolutionized the spark plug industry. This substance subjected to severe electrical tests in competition with porcelain, as an insulating material, withstood a 10 per cent. higher voltage than the finest porcelain obtainable. Every Master plug is wrapped in felt and packed in a round metal box that may be carried in the tool box without fear of breakage.

Manufactured by the Hartford Machine Screw Co., Hartford, Conn. Price quoted at request.

The Hurricane Hook is a nickeled rod 5/16 of an inch and about six inches long. One end fastens to the door and the other end to the body holding the door open



enough to let in the air, but not far enough to extend beyond the running board. Fitting flush there are no projections to tear the clothing nor rattle. When it is not in use it can be left hanging down or lifted off and stored away in the car pocket. It is adjustable to all makes of cars, is well made and mechanically correct.

Manufactured by Joseph N. Smith & Co., Detroit, Mich. Price 60 cents.

Hoosier Patch. A handy repair patch is being put on the market under the name of Hoosier Patch. This article is designed to make a quick repair without the use of heat or gasoline, and the manufacturers claim that a repair made with this patch is practically permanent. They claim that the vulcanizing operation is accomplished by the heat arising from the friction of the tire when in use. With the outfit il-

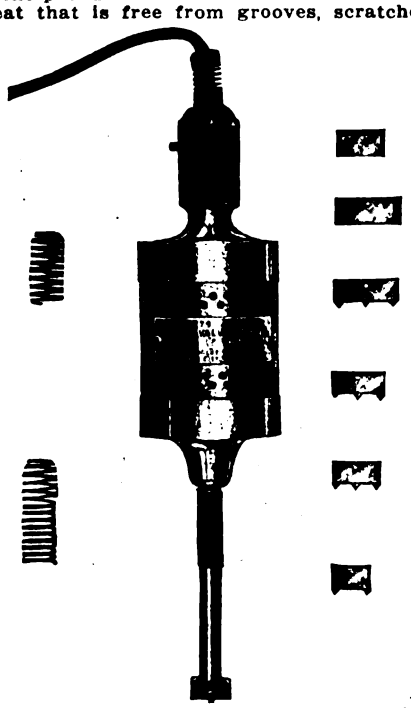


lustrated is included one patch, together with sand paper and patch solution in a self-sealing tube. In outfit No. 1 the patch contains 108 square inches; in outfit No. 2 the patch contains 54 square inches.

Manufactured by Hoosier Rubber Manufacturing Co., Inc., Starks Bldg., Louisville, Ky. Price of outfit No. 1, $1.75; outfit No. 2, $1.

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The Eclipse Valve Grinder is a practical and reliable electric driven machine, designed and built for the sole purpose of grinding valves to a perfect seat with the greatest possible dispatch and economy. The vertical handle with plunger switch affords perfect control, while the weight of the device (4½ pounds) is so proportioned as to secure the proper pressure for the best results; and the smooth gliding motion imparted by the ballistic movement produces a finish to both valves and seat that is free from grooves, scratches

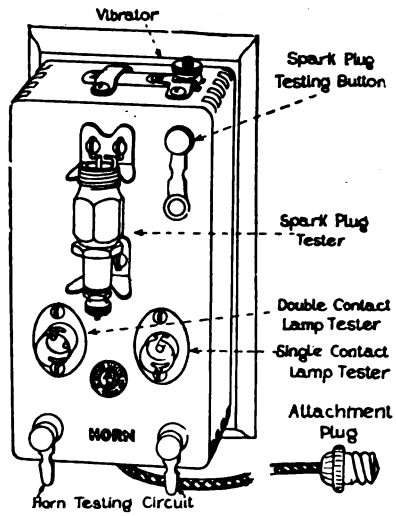


or other evidences of poor workmanship. With this machine few valves require as much as a four-minute treatment—many are finished in one minute.

Manufactured by the Eclipse Valve Grinder Co., 415 Bonfils Building, Kansas City, Mo. Price quoted at request.

Cole Gasoline Gauge. No matter what car is being driven the driver at some time or other is apt to neglect the filling of the gasoline tank. This usually means a delay and possibly a long walk for more fuel. This trouble is said to be eliminated when the Cole Gas Gauge is used. This device is designed for any gasoline tank with the exception of those in cowl and operated by air pressure. It is made in two parts, the first or float part, is attached to the gasoline tank; the second or indicator, may be attached to the dash, or beside the wheel and visable at all times. It makes a handy device for checking up the car mileage with the gasoline consumed, and is an assurance that the gasoline purchased is full measure.

Manufactured by the Halewick-Muehlhausen Co., 2350 West Austin Ave., Chicago, Ill. Price $5 for any make of car.



Combination Tester. A handy all around testing device for the repair man and accessory dealer, as well as the individual is illustrated. It is designed for testing spark plugs, single or double contact lamp bulbs, horns, or for locating general electrical troubles. There are two types, the first for attachment to alternating current lighting circuits, and the second for battery attachment. In either case lamps of any candle power or voltage, spark plugs of any length, or electric horns of any voltage can be tested.

Manufactured by Jefferson Electric Mfg. Co., 426-430 South Green St., Chicago, Ill. Prices quoted at request.

Common Sense Auto Polish is a non-greasy liquid that is strong enough to remove all foreign matter, even cup grease, but is so mild that many of the large piano dealers in the country use it to keep their stock in good condition. It cleans



and polishes in one operation, removes all road oil and grime down to the original factory finish and leaves a highly polished dry surface that will not collect dust.

Manufactured by the Common-Sense Manufacturing Co., St. Louis, Mo. 35c size, 75c size, and quart, $1.50.

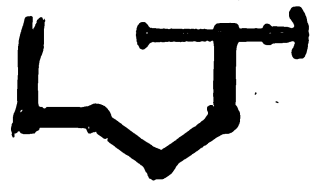
Howe Searchlight Bracket. Inasmuch as the idea behind the searchlight is the providing of a freely turning light, it is obvious that the bracket is of importance. One of the advantages of the Howe spotlight is its ingenious bracket arrangement. This bracket is of the universal joint type and both joints can be turned at the same time so that the lamp may be moved instantly at any angle, with but little effort. Although it may be moved easily, it is said that the lamp stays where it is directed until again moved because of the patented spring control. Two



coil springs hold the two joints in a firm, even pressure, make it easy to burn, but hold it firmly wherever turned unaffected by jars and vibration.

Manufactured by Howe Mfg. Co., Chicago, Ill. Price quoted at request.

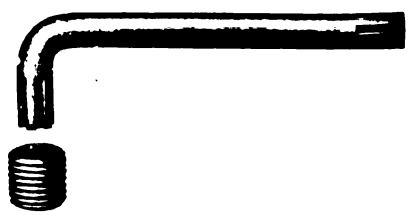
Universal Clamp. As the name indicates, the Crescent Universal Clamp is an all around, universal tool. It is made of the best malleable iron with steel screw and square cut threads. It can be adjusted from a straight bar to a hoop, and presents a rigid position at all angles. It has many uses; as a valve lifter it may be ad-



justed to fit practically any valve system; it can be used as a straight or off-set bar for close work around the engine and is of assistance in removing tires.

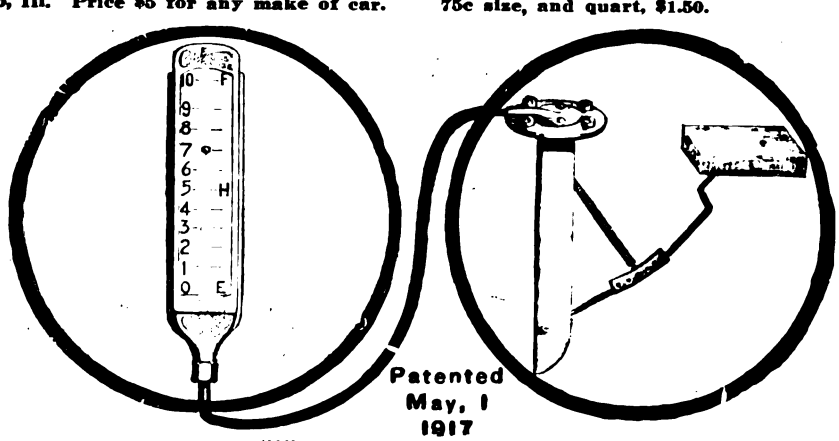
Manufactured by Chas. D. Durkee & Co., 2 South St., New York City. Price quoted at request.

The Bristo Safety Set Screw is equipped with dove-tailed slots or flutes, into which the corresponding dove-tailed projections of the wrench fit. When these set screws are being set up by means of this special wrench there is no tendency for the wrench to expand or split the screw, even if great pressure is applied to the handle



of the wrench, but instead there is a tendency for the wrench to contract the screw on account of the angles at which the faces of the dove-tailed flutes and slots bear against each other.

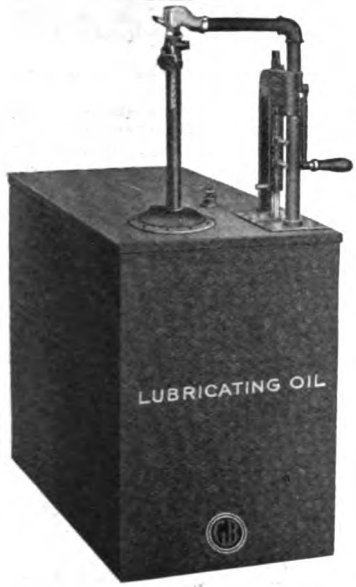
Manufactured by the Bristol Co., Waterbury, Conn. Prices for standard and special screws sent upon request.



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The Gilbert & Barker T-30 Handling Outfit can be furnished as a unit or as a battery of units to handle several grades of oil. The pump measures accurately quarts or lesser quantities; fills the oil can without overflow or waste. A drip pan returns the oil accidentally spilled; a stick

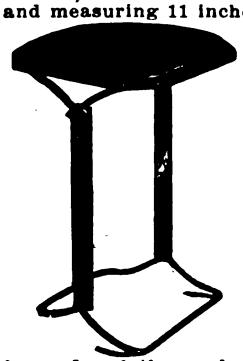




gage shows the approximate contents of the tank and a lock safeguards the supply.

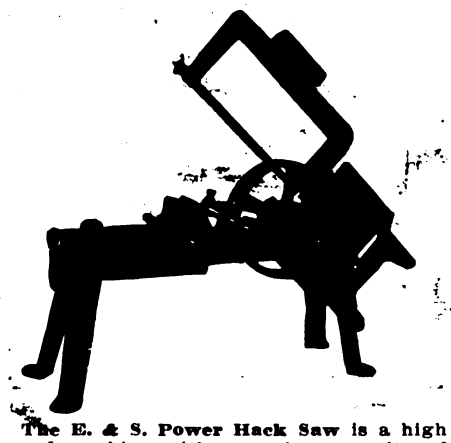
Manufactured by Gilbert & Barker Manufacturing Co., Springfield, Mass. Price quoted at request.

The Buffington Folding Upholstered Stools are made with seats upholstered in imitation leather, black or maroon, tufted with hair and measuring 11 inches square.



The seat is made of three ply, one-half inch veneer, and the manufacturers state that they will not warp or break.

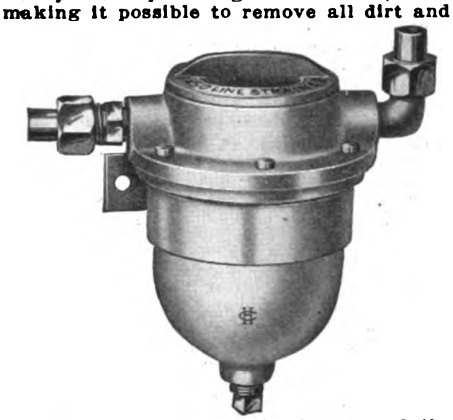
Manufactured by C. A. Buffington & Co., Berkshire, N. Y. Price quoted at request.



The E. & S. Power Hack Saw is a high speed machine with a sawing capacity of 4 by 4 inches. The saw arm takes a nine-inch blade and is driven by a crank working between V bearings and is equipped with a sliding weight to regulate the pressure to secure the best results from the saw blade. It has an automatic stop and is driven by a 2x10 crown pulley, or a crank can be furnished for hand driving.

Manufactured by Ellis-Smith Manufacturing Co., Inc., 216 Niagara St., Buffalo, N. Y. Price, $18.

The Holtzer-Cabot Gasoline Strainer is made of an aluminum casting with a bronze wire screen of 120 mesh with over six square inches of surface. The gasoline enters through the bottom of the strainer and passes up through the screen, thus making it possible to remove all dirt and

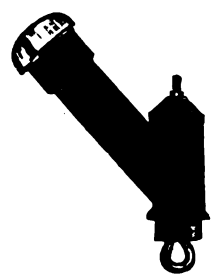


water that falls to the bottom of the strainer, through the screw plug at the bottom. The wire screen cap can be taken out by unscrewing the top wing nuts.

Manufactured by the Holtzer-Cabot Electric Co., Roxbury, Mass. Price quoted at request.

Hoyts Quality Breather and Oil Filler Pipe is intended for Ford cars. It prevents oil from spraying over motor, fan belt, wires and inside of the hood, and makes replenishing of oil an easy matter without spilling. Inside of the breather there is a very fine mesh strainer, which strains all oil poured into the motor. Installation is said to be very easy and when once fastened by passing timer bolt through hook, as shown in cut, it becomes stationary and cannot rattle loose.

Manufactured by Hoyts Auto Supply Co., 370 Fairfield Ave., Bridgeport, Conn. Price, 75 cents.



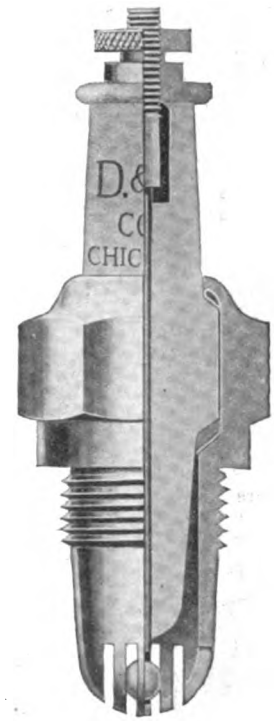
Howe Counter Display. That the counter display is an aid in selling goods has been demonstrated in many cases. It acts as a memorandum to the customer, and, if the display is attractive, frequently "persuades" the buyer into making an unexpected purchase. The Howe display, illustrated herewith, is attractively lithographed in red, white, blue, gray and black, and upon it is provided a space to show styles of the standard size. Howe searchlights, with and without rear view mirror, and also the Howe Junior, a single shell popular priced model. In addition to the light display are spaces for six of the special Howe clamps by which the lights may be attached to various types of windshields. This attractive display stand for counter or window display, together



with a set of windshield clamps, is furnished free to Howe dealers.

Manufactured by Howe Mfg. Co., Michigan Ave., Chicago, Ill. Price quoted at request.

D. & D. Spark Plug. This plug consists of a moving ball imprisoned in a slotted cage, and so designed that the ball is held at all times between the plug electrodes, but free to move or vibrate. Due to the varying compression and the movement of the piston the ball is in motion constantly as long as the engine is running, thereby keeping all of the sparking surfaces free

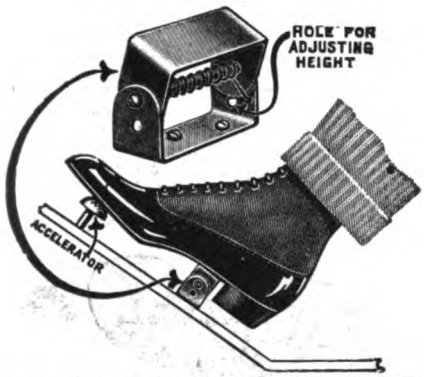


and clean from carbon or soot. It is also claimed that the ball has a condensing or storing effect, thereby increasing the intensity of the spark and making the explosion stronger.

Manufactured by the D. & D. Co., 20 E. Jackson Blvd., Suite 810, Chicago, Ill. Price, $2 each.

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The New York Foot Supporter was designed to overcome the great amount of leg and muscle strain in operating the accelerator over rough roads, for every jar or jolt is transmitted through the foot and has its effect upon the action of the engine. As the illustration shows it is attached to the footboard in such a manner



as to support the weight of the foot upon an adjustable hinge. Two screws secure the device and once installed the position is always correct.

Manufactured by New York Coil Co., 338 Pearl St., New York City, N. Y. Price quoted at request.

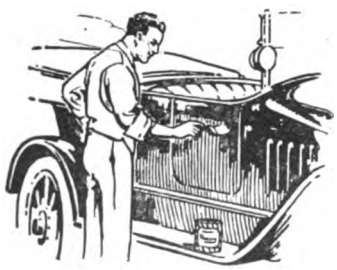
Pneumatic Jack. Jacking up the car is one of the necessary evils which the motorist is bound to face sooner or later. When the rear springs, body or spare tires are in the way, it is often a big problem to raise the jack after it is placed either on the car or the road without soiling the clothes. The National Pneumatic Jack is operated by air pressure, forced through a long flexible tube by either an ordinary



hand or power pump. It is claimed that the air pressure will hold up a car for at least several hours, and usually several days. A mechanical lock is provided to hold up car for storage. The makers cover it by a liberal guarantee and will send it for a 10 days free trial.

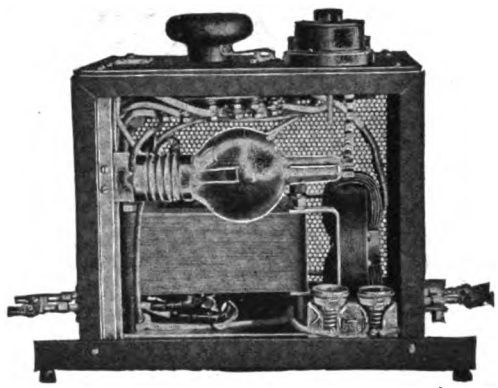
Manufactured by National Motor Supply Co., Cleveland, O. Price, $6.

Vietrolene is a scientifically compounded cleaner and polisher for automobiles. The manufacturers claim that it will remove all tar and road oil and restore the finish of the car to its original luster; also that



it will remove any rust that is on the nickel parts of the car. It may also be used to clean the leather upholstery and keep it soft and pliable.

Manufactured by Vietrolene Co., 39 Pearl St., Boston. Prices from 25 cents for half pint can to $3 for one gallon can.



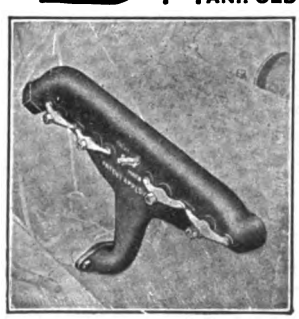
The Tungar Rectifier solves the problem of converting this supply of alternating current into direct current, for alternating current cannot be used for charging direct. This device consists of a rectifier tube, rheostat, switch and ammeter mounted on and in a sheet iron fireproof box, which may be bolted to the wall in any convenient place. The outfit has a capacity of six amperes and 75 volts and may be used for charging from one to 10 three-cell storage batteries at one time, from 115 volt current source. Two leads from the upper part of the rectifier box are connected with the alternating current, while the two lower are connected with the storage batteries to be charged. When the switch is turned on the current flows through the batteries, the rectifier tube need not be shaken to start the flow. If for any reason the source of current should fail the batteries cannot discharge through the rectifier, but will continue charging as soon as the current supply begins again. The device comes complete and ready to attach, the box is amply ventilated to take away the generated heat, compactly made and neatly finished.

Manufactured by the General Electric Co., Schenectady, N. Y. Price quoted at request.

The Shurnuff Combination Manifold is a one-piece casting combining the intake and exhaust, being cast integral and so constructed as to allow the exhausted or fired gases to pass over the intake in such a manner that the incoming vapor is properly mixed and dried before entering the cylinders, thus insuring a smoother running and more powerful engine at all speeds and a saving of fuel.

Its efficiency in thoroughly vaporizing the mixture makes it possible to utilize the low grade gasolines, that have more heat units than the higher grades, which fact is responsible for the increased power,

Shurnuff COMBINATION MANIFOLD



faster pick up and the ease in starting that results from the use of the combination manifold.

It is designed for the Ford engine and solves the problem that has been confronting Ford owners for some time of how to properly utilize the low grade fuels they are now obliged to buy and obtain greater efficiency from their motors.

Manufactured by the Shurnuff Manufacturing Co., St. Louis, Mo. Distributed by the Zinke Co., Chicago, Ill. Retail price complete, $9; west of Rockies, $10; in Canada, $12.50.

Norwesco "Twelve-Twenty" does away with all guess work in connection with radiator protection. No longer need the motorist wonder whether his non-freeze is strong enough every time a cold snap comes. He knows his radiator is absolutely safe down to 20 degrees below zero. Any one who has put in a messy half hour measuring and compounding a non-freeze mixture will appreciate "Twelve-Twenty."

The solution is made with a specific gravity of 1220, hence its name. If evaporation or leakage causes changes in the solution the hydrometer discloses that fact and a weak solution may then be restored to standard strength by the addition of more of this liquid. If the test shows undue strength, dilution with water corrects the defects. Thus the motorist may test his non-freeze solution as he does his tires or battery and the close check he can keep



on the solution should go a long way towards reducing last winter's record of frozen radiators.

Manufactured by the Northwestern Chemical Co., Marietta, O. "Twelve-Twenty" is sold in three sized containers. One gallon cans, $1.25; three gallon cans, $1.15 per gallon, and five gallon cans, $1 per gallon.

The Niswander Rim Remover is a practical and handy tool for removing and replacing the demountable rim in automobile tires. The contracting and expanding is done by right and left hand threaded rods operated by a hand wheel, which gives an even and steady pull, contracting the rim

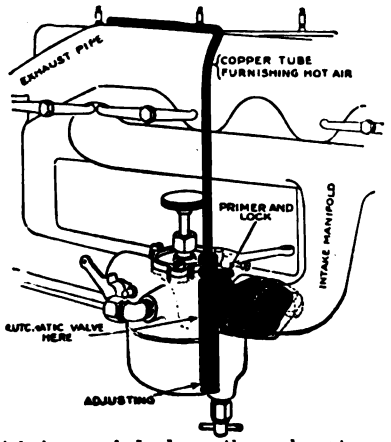


anywhere from one to four inches, and the rim hooks, together with the rim braces, are so constructed that the harder the pull the tighter they grip the rim in either operation. The rim hooks are made of a good grade of spring steel and will, therefore, adjust themselves to any width rim. The tool weighs two and a half pounds and folds to a length of nine inches, making it possible to store it in the tool box.

Manufactured by the Niswander Manufacturing Co., Quincy, Ill. Price, $3.50.

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National Mix-O-Lock. A combination auxiliary air mixer, a priming device and carburetor lock is introduced under the name Mix-O-Lock. This device consists of a gasket shaped casting which fits between the carburetor and manifold. Leading to the gasket is a long copper tube,



which is carried along the exhaust manifold and through which hot air is drawn into the manifold. The amount of air may be adjusted for the best running. Fitted upon the top of the gasket is a primer plug, and when the plug is removed the excess air which is admitted effectually prevents the starting of the engine until the plug is returned.

The manufacturers claim a gasoline saving of from 25 to 50 per cent. when this device is used, owing to the more efficient combustion of gasoline and a better mixture.

Manufactured by the National Motor Supply Co., Painesville, O. Price, $2.

National Rubber Tire Filler takes the place of air in the tire, doing away with the inner tube, thus making punctures, rim cuts and blow outs impossible. It is made in the best quality rubber, cut into small particles and vulcanized together in such a manner that the makers claim it will produce all the resiliency and easy riding qualities of air. It is not melted and run into the tire, but is moulded in



cylindrical forms to fit the various sized casings, and is placed in the casings in lengths, after which the casing is pressed onto the rim with special tools provided for the purpose, giving the same pressure as a casing well inflated with air. When the casing wears out the filler can be removed and replaced in new casings.

Manufactured by the National Rubber Filler Co., Midlothian, Tex. Price quoted at request .

The "Break-Not" Storage Battery Tester shows at a glance whether the battery is empty — half discharged — or fully charged. More than half of the instrument is made of red rubber, which eliminates breakage to a great extent. The instrument is guaranteed accurate and the scale is clearly and plainly marked.

Manufactured by E. Edelmann & Co., 119 W. 42nd St., New York City, N. Y. Price, complete in mailing tube, $1.

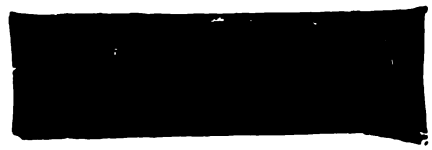




The Ever Safe Emergency Brake Shoes for Fords eliminates the drag on the brakes by allowing the expander to always lay flat with the jaws of the shoe, thus saving gas and oil. It is adjustable to the drum by enlarging the diameter of the shoe itself. By springing the jaws to one side, washers may be added or removed to take up for the wear of lining or drum, thereby allowing the expander or cam to lay flat with the jaws and a much longer travel of expander at all times, leaving the shoe suspended and contracted to its smallest diameter. It is easily installed without the drilling of holes and it takes the place of the regular cast iron brake shoe.

Manufactured by the Never Break Products Co., Bangor, Pa. Price quoted at request.

Laminum consists of a number of sheets of brass .002 or .003 of an inch in thickness, firmly held together by a metallic binder. The appearance is that of a solid piece, yet each sheet may be peeled off, leaving the thickness slightly less than before. It may be purchased in sheets to be cut to any size, or made up into the shape of bearing shims. After the leaf



has been peeled off the resulting surface is said to be absolutely smooth, without grain or grit of asy kind. The advantages claimed for this type of shimming material are that it is solid, offering no surface for grit to adhere to and that necessary adjustment may be obtained without filing, leaving the surface smooth and free.

Manufactured by Laminated Shim Co., Inc., Canal St., New York, N. Y. Price quoted at request.

Pyramid Brushes are made in about 300 different sizes for the various starting and lighting systems on the market. These brushes have been developed in co-operation with the starter manufacturers in order to get a brush which would meet the requirements of each particular equip-



ment. This means that when you purchase a Pyramid Brush you are getting the same standard brush that was designed for the lighting system of your car.

Manufactured by the National Carbon Co., Inc., Cleveland, O. Price quoted at request.

Cuno Auto Cigar Lighter. The electric cigar lighter fills a much needed want on the motor car. The Cuno Auto Cigar Lighter is simple, efficient and reliable. The burner tip is made of heavy wire and will last indefinitely. It is equipped with six foot cord that automatically rewinds after being pulled out for use. It is finished in nickel and mounted upon the dash by drilling a hole 25/32 of an inch in diameter and inserting the neck from the rear of the dash and tightening nut. A resistance coil is furnished for use with cigar



lighter on cars having either 12, 18 or 24 volt batteries. Connecting the battery wire to one end of the coil, connecting other end of screw on round fiber disc on side of the lighter and connecting the other screw to ground makes lighter ready for use.

Manufactured by the Cuno Engineering Corporation, Meriden, Conn. Price quoted at request.

Letts Manifold Heater. This device is intended to counteract the poor qualities of low grade fuel and to increase the mileage obtainable from it. In fact, it is guaranteed to afford an increase of from 20 to 40 per cent. per gallon. It differs from other types in that it is a two-unit type, instead of being cast integral with the manifold intake upon which it acts. It takes its heat from the exhaust and breaks up the globules of gasoline into a thorough vapor, making for instant combustion and minimum carbonization. A feature of the device is that it is in two parts, which makes it easy to attach or detach and gives the owner opportunity to



clean it out at necessary periods without difficulty. The cleaning feature is valuable, because, due to the nature of manifold heater castings, carbon collects on the walls and interferes with carburetion. The maker advises that the device is equally serviceable in warm or hot climates, where considerable trouble frequently arises through the water in the radiator boiling. The Letts device maintains regular and quick firing and in that way insures a comparative and desirable coolness in the power plant.

Made by the Hill-Smith Metal Goods Co., 88 Pearl St., Boston, Mass. Retail price, $6.

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LEGAL DISCUSSIONS OF INTEREST

COLLISION WITH STREET CAR.

The New York Appellate Division Court holds, Keines vs. New York Rys. Co., 171 N. Y. Supp. 53, that an automobilist on a street too narrow to keep off the street railway tracks, had the right to assume that a street car proceeding in his rear would recognize his right to use the street, and that if on signal of an officer at a crossing he gave warning to vehicles in the rear that he was about to stop, the street car would also stop and avoid a collision. A motorman approaching a crowded intersection behind an automobile must have his car under control, so that he will not run into it if it stops, regardless of the distance between the car and the automobile.

SCOPE OF CHAUFFEUR'S EMPLOYMENT.

In an action against the owner of an automobile for death caused by the car while it was being driven by his chauffeur, the New York Court of Appeals holds, Rose vs. Balfe, 119 N. E. 842, that the prima facie evidence of the owner's responsibility for the accident established by evidence of the ownership of the car and the employment of the chauffeur is overcome by substantial evidence rebutting such responsibility. The owner of the car directed the chauffeur to put it in dead storage, under instructions not to use it without permission. It is held that in such circumstances the chauffeur has no implied authority to violate orders, and without the owner's knowledge or consent to take the car out for the purpose of testing it; and, such act being unauthorized, the owner is not liable for an accident resulting therefrom.

CONDITIONAL SALES—RIGHT TO RESELL.

Under a conditional sale contract of an automobile, making time of payment of the essence of the contract, the seller took possession of the automobile sold, after the buyer's default. The buyer made no reasonably prompt tender of performance. It was held in an action by the buyer to recover damages for the conversion of the car, Magee vs. W. J. Burt Motor Car Co. (Cal.), 174 Pac. 687, that the seller had the right to resell the car, which right was not lost by accepting partial payments after the entire contract became due.

COLLISION WITH STREET CAR.

In an action against a street railroad for compensation for injuries to an automobile driver who attempted to cross a track, the Michigan Supreme Court holds Keichle vs. Detroit United Ry. 168 N. W. 972, that the driver's act in proceeding to cross the track when there was no approaching car within 250 feet, nor within view, did not constitute negligence. His act in turning so as to receive a glancing blow instead of direct impact with a car bearing down on him was not contributory negligence as matter of law. He had the right to assume that if a car were approaching beyond the limits of his view, 250 feet, it would not be operated across the street he was on, one much traveled, at more than 30 miles an hour.

ACCEPTANCE AND RETENTION OF CAR.

In an action for breach of contract in the sale of an automobile by the delivery of a second hand one instead of a new car, where the evidence supported pleas that the plaintiff retained the car after discovering that it was second hand and did not offer to return it, but paid the balance of the purchase price, the Alabama Court of Appeals, Bonds vs. Marsh, 79 So. 631, affirmed a judgment for the defendant.

EVIDENCE AS TO WARRANTY OF CAR.

In an action to recover on a promissory note where one of the defenses is the breach of an alleged warranty in the sale of an automobile, the Illinois Appellate Court holds John Hemwall Automobile Co. vs. Derby, 207 Ill. App. 46, that the question whether such warranty was made is for the jury. Another defense set up was false and fraudulent representations by an agent of the plaintiff. It was held that the questions whether such representations were made by one who was the plaintiff's agent and were acted upon by the defendants to their injury were also for the jury. Judgment for the plaintiff was affirmed.

AGREEMENT FOR RETURN OF CAR IF UNSATISFACTORY.

The Illinois Appellate Court holds Davis vs. Mitchell Automobile Co., 207 Ill. App. 30, that evidence that on delivery of a car, bought under a written contract which provided that if the car was not as represented the deposit would be returned, the agent delivering it to the purchaser said that if the car was not satisfactory it could be returned and the initial payment thereon would be refunded, is admissible, not to vary the contract, but as showing that by receiving the car the purchaser did not admit that it was satisfactory nor that the contract had been performed on seller's part.

CHAUFFEUR'S ASSUMPTION OF RISK OF OBVIOUSLY DEFECTIVE BRAKES.

A complaint in an action by a chauffeur against his employer alleged that in 1916 the defendant employed the plaintiff to operate his car in various parts of Connecticut; that "when the plaintiff entered upon said employment and began to operate said automobile the same was in such a defective condition that it was not only unsafe, but dangerous to use the same in public streets or highways where there was any considerable travel, said condition being due to defective brakes, which were wholly insufficient to enable the plaintiff or any operator to control said automobile, which condition was unknown to the plaintiff, but was well known to the defendant; that while operating the same in and through the town of Cromwell and because of the inability of the plaintiff to control said automobile, caused by the aforesaid defective condition of said automobile, the said automobile struck and seriously injured a female pedestrian; that the plaintiff by reason thereof, although he was wholly innocent, was charged by the State of Connecticut with reckless driving and assault and battery; that he was compelled to and did employ an attorney to defend him and protect his rights, and that he necessarily expended for the fees of his attorney, stenographic fees and transportation, the sum of $169. In addition to this he claimed damages for the humiliation suffered by him on account of his arrest." The Connecticut Supreme Court of Errors holds, Plasikowski vs. Arbus, 103 Atl. 642, that an employer is under no obligation to warn an employee of dangers which are obvious, nor to instruct him in matters which he may fairly be supposed to understand. Nor is it the duty of the master to admonish the servant to be careful, when the servant knew or ought to have known the danger and the importance of using care to avoid it. It must be assumed that one employed as a chauffeur is familiar with the ordinary parts of an automobile and is a competent operator. Any defect in the brakes was as obvious to the plaintiff as to the defendant, and the defendant owed no duty to warn, and the danger of running down a pedestrian because of such defective brakes was an obvious risk which the plaintiff assumed. The defendant was therefore not bound to indemnify him for expenses in defending a prosecution for reckless driving.

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APPROACHING STREET INTERSECTION.

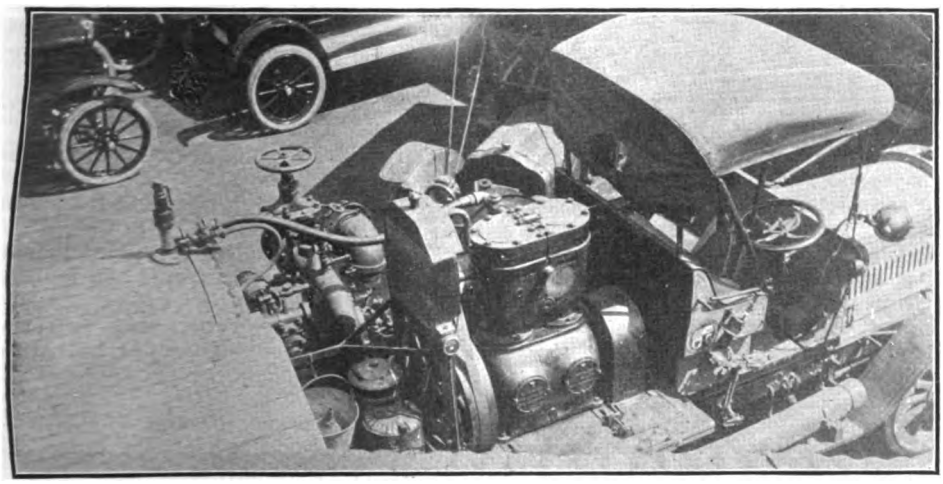
In an action for personal injuries sustained in a collision of automobiles at night the Pennsylvania Supreme Court holds, Bew vs. Daley, 103 Atl. 832, that a driver of an automobile approaching a street intersection may assume that another automobile approaching on the intersecting street will do so at a moderate speed and under control, as no one is bound to anticipate the negligence of another. When the plaintiff stopped his car before reaching the street intersection, it could not be said, as a matter of law, that he was negligent in not sounding his horn, in view of his testimony that when the danger appeared he considered it his duty to stop his car, and that he had not time to do both, and it was held that the question should have been submitted to the jury.

SELLER'S LIABILITY FOR CONVERSION.

Where a guardian buys an automobile for his personal use and pays therefor with the knowledge of the seller, out of his ward's funds, the Arkansas Supreme Court holds, American Surety Co. vs. Vaun, 205 S. W. 646, that the seller is a party to the conversion of the trust funds and is liable to the ward for the sum received.

AGENCY OF DRIVER.

The driver of a loaned automobile was arrested for speeding and taken to a police station. His friend riding with him took the automobile to go to the central police station to deposit bail and get an order for the driver's release. Returning from this errand he ran into and injured a woman. It is held, Stoddard vs. Fiske, 170 Pac. 63, that the arrested driver was not liable for the injury; there being no legal relation between him and his friend but mere friendship.



"Close-Up" of Equipment of a Truck Fitted with Centrifugal Water Pump and Air Compressor for Operating Pneumatic Tools, Specially Designed for the Bureau of Water Works, Los Angeles, Cal. At the Left of the Compressor Radiator Is the Flanged Elbow of the Water Pump Intake, as Positioned When Not in Use; at the Left of the Centrifugal Pump Is the Small Air Pump and the Hose Connection with the Main Air Tank.

Combination Water Pumping Apparatus

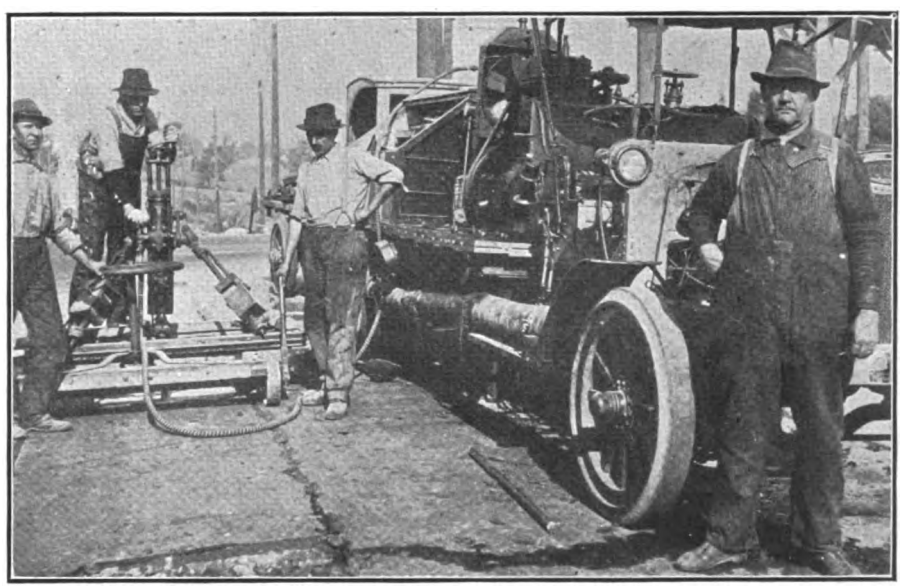
An apparatus that is very unusual in design, and is said to be the only one of the kind in the United States, has been constructed for the use of the Bureau of Water Works of the city of Los Angeles, Cal. Los Angeles has one of the largest and most expensive water distributing systems of the nation, the water being brought a long distance from a mountain range through a very large aqueduct. The city itself covers an area much greater than any other city of similar population and the system was constructed with a view of meeting the requirements of rapid growth for a considerable period of years.

The water distributing system requires much more maintenance work than would be necessary in a city of smaller area. To expedite both construction and repairing a truck chassis was equipped with a large centrifugal pump for pumpage of any kind, and an air compressor for operating pneumatic tools and obtaining air pressure wherever this could be utilized in the work. The two accompanying illustrations show the chassis and its equipment, and the pump and compressor installed so that the detail can be distinctly seen.

The chassis is fitted with a double power transmission system, the one for driving the truck and the other for driving the pump and the air compressor. The double system is controlled by the two levers seen just below the side of the driver's seat. Many novel ideas are incorporated in the installation of the pump and the compressor. A speedometer from an automobile has been utilized to determine the speed of the compressor. The compressor has an independent cooling system in which is included a radiator removed from a Ford chassis, and the fan for this radiator is driven by a belt off the flywheel of the compressor.

At the rear of the chassis can be seen the storage tank for the compressor system, and connected with this tank is a small air pump that is used to prime the main pump with water.

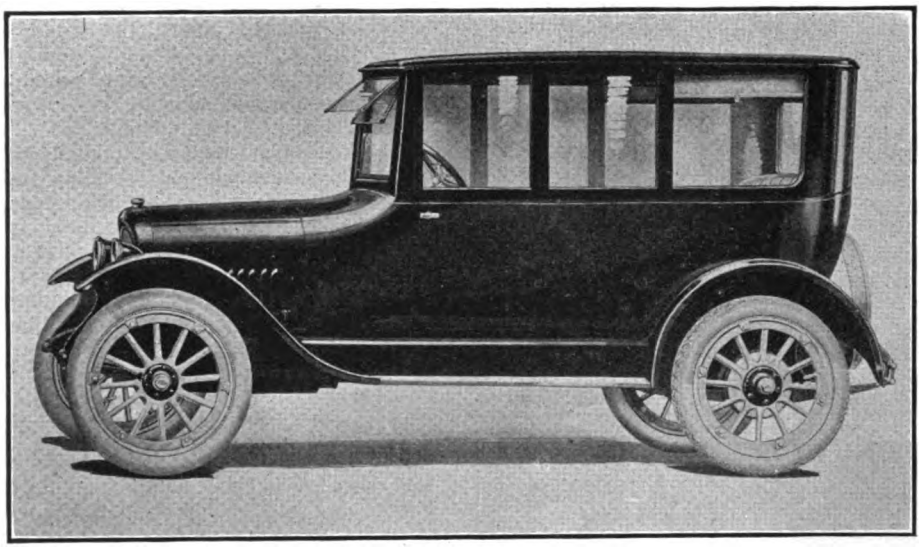
The illustration of the detail of the equipment shows the radiator of the compressor cooling system, the flanged elbow of the main pump and its position when not in use. This also shows the small air pump at the left of the centrifugal pump and the hose connection between the tank and the air pump. One of the uses for the air compressor is to drive pneumatic drills for cutting asphalt and cement paving bases. Statement is made that the equipment has been proven very serviceable and economical, and the combination has fully justified the ideas of the engineer who conceived it.



Combination Water and Air Pump Equipment of the Los Angeles Bureau of Water Works with Outfit for Cutting Asphalt and Cutting Concrete Bases Connected to the Main Air Supply and in Readiness for Work. This Machine Is Said to Be the Only One of the Kind in the World.

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LATEST ALLEN CAR--THE 41 SEDAN



The Latest Production of the Allen Motor Car Co., the 41 Sedan, with Full Equipment, Designed for All-Year Purposes.

Among the new closed cars of the 1918-19 season, one of the most attractive is the Allen 41 sedan, limited deliveries on which are now being made to dealers throughout the country.

This new sedan, the result of many months of careful planning and manufacture, is built on the standard Allen 41 chassis, which has been thoroughly proven by thousands of owners during the past 12 months.

The top of the sedan is permanent and of handsome design. All side windows can be lowered completely. The door pillars are permanent, thus insuring greater strength to top.

Doors are "staggered"—the one on left opening into the driver's compartment, the one on right into the rear compartment. The driver's door locks with a thumb latch, while the door to the rear compartment is fitted with a Yale lock.



The Front Compartment of the Allen 41 Sedan, Showing the Splendidly Upholstered Seats, with Wide Aisle Between Them, and the Instrument Board and Control Members.

A satisfactory ventilating fixture is found on the driver's door.

The sloping windshield is full ventilating and fitted with an adjustable rain visor.

Body and hood are finished in Liberty blue, a very popular shade, while the top, radiator and fenders are black and the wheels cream colored.

The upholstery is a heavy worsted of dark gray color with green figure. Top lining, floor carpet and covering of foot rail are durable materials, which harmonize with upholstery. The roller curtains at rear windows are of gray silk.

Front seats are divided. A round robe strap, covered with regular upholstery material, is attached to the back of each of the front seats.

A rotary switch on steering column, directly beneath steering wheel, controls the entire electric system—starter, ignition, head and tail lamps, dimmers and motor driven horn. Light for the interior is furnished by an etched center dome light, switch for which is conveniently located.

Comfortable, convenient and adapted to use in all weathers, this new Allen sedan is attracting much attention at $1795 f. o. b. the factory; but this price is subject to advance without notice.

The following are the brief specifications of the chassis and its equipment:

Engine—Allen, L head type; four cylinders, 3¾ inches bore by five inches stroke; piston displacement, 221 cubic inches; extra heavy galvanized crank shaft, 2¼ inches diameter at connecting rod bearings.

Valves—1⅝ inches diameter, cast iron heads; nickel steel stems; valve spring chambers enclosed; push rods adjustable.

Cooling—Thermo-syphon; radiator of ample capacity; perfex honeycomb type core; trunnion type suspension.

Lubrication—Combination force pump feed and constant level splash system.

Ignition—Connecticut system with automatic circuit breaker; Champion plugs.

Carburetor—Stromberg, with hot air connection to exhaust manifold; air control on instrument board.

Clutch—10 inches Borg & Beck single dry disc clutch.

Transmission—Allen selective sliding gear type, assembled to motor, forming unit power plant; S. K. F. bearings on both shafts; all gears ⅝ inch wide face; gear ratios between motor speed and rear wheels: High, 4.45 to 1; second, 7.57 to 1; low, 14.25 to 1; reverse, 16.8 to 1.

Front Axle—One piece, I beam type; drop forged from special carbon steel; Bower roller bearings in front hubs.

Rear Axle—Full floating type; heavy pressed steel housing; ring gear and pinion with spiral teeth 1¼ inches wide across face, assuring strength and quietness; full Hotchkiss drive: hollow propeller shaft with two universal joints.

Wheels—32 inches artillery type; Firestone demountable rims; one extra.

Tires—33 by 4 inches; straight side, anti-skid treads in rear.

Wheelbase—112 inches; width of tread, 56 inches; road clearance, 11 inches.

Springs—Rear, semi-elliptic, underslung, 55 inches long; front, semi-elliptic, 34 inches long.

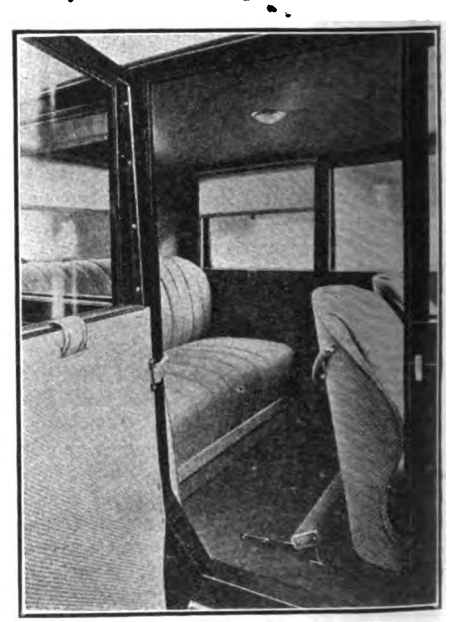
Steering Gear—Worm and full gear type; worm operating against ball thrust bearings; 17 inches steering wheel with corrugated rim.

Brakes—Service brake 12¼ by 2 inches, external contracting; emergency brake, 12 by 1¾ inches internal expanding.

Starting and Lighting—Auto-Lite two-unit system; electric control on steering column.

Fuel Tank—Hung at rear; 13-gallon capacity, with gasoline gauge; Stewart vacuum fuel feed system.

Body Details—Five-passenger; perma-



The Rear Compartment of the Allen 41 Sedan—Note the Long, Well Cushioned Seat, the Ample Leg Room, the Wide Windows and the Generous Door, Affording Luxurious Driving Comfort.

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nent top; disappearing side windows; staggered doors; passage way between front seats; attractive gray and green worsted upholstery with gray top lining and carpet to match; silk roller curtains at rear windows; resilient double deck cushion springs; etched center dome light; robe straps; foot rest; sloping windshield, full ventilating, with adjustable rain visor; ventilating fixture on driver's door; driver's door locked by thumb latch; Yale lock on right hand door.

Fenders—Full crowned; aluminum covered running boards; mud splash guard below radiator.

Instrument Board—Pressed steel over wood, finished to harmonize with upholstery; mounts Stewart speedometer, ammeter, carburetor air control, automatic ignition indicator, electric lamp and switch for center dome light.

Finish—Liberty blue body and hood; radiator and fenders black; wheels cream colored.

Standard Equipment—Starter, double bulb headlamps, tail lamp, Garford motor driven horn—all with steering column control switch; Stewart speedometer, rear tire irons, extra demountable rim, tool kit, tire repair kit, tire pump, jack, instruction books.

Weight—Sedan 2775 pounds, approximately—complete, ready for shipment.

Triplexd Hose Shown at a Convention of Oil Men

What is stated to be the most complete display of gasoline and oil hose ever shown was made in booths 28, 30, 32, the space occupied by the Metal Hose and Tubing Co. of Brooklyn, N. Y., at the convention of the Independent Oil Men's Association, which took place at the Hotel Biltmore in New York City, the week beginning Oct. 7. This convention was attended by delegates from all sections of the country and was an event of unusual importance to them and the concerns holding membership in the association.

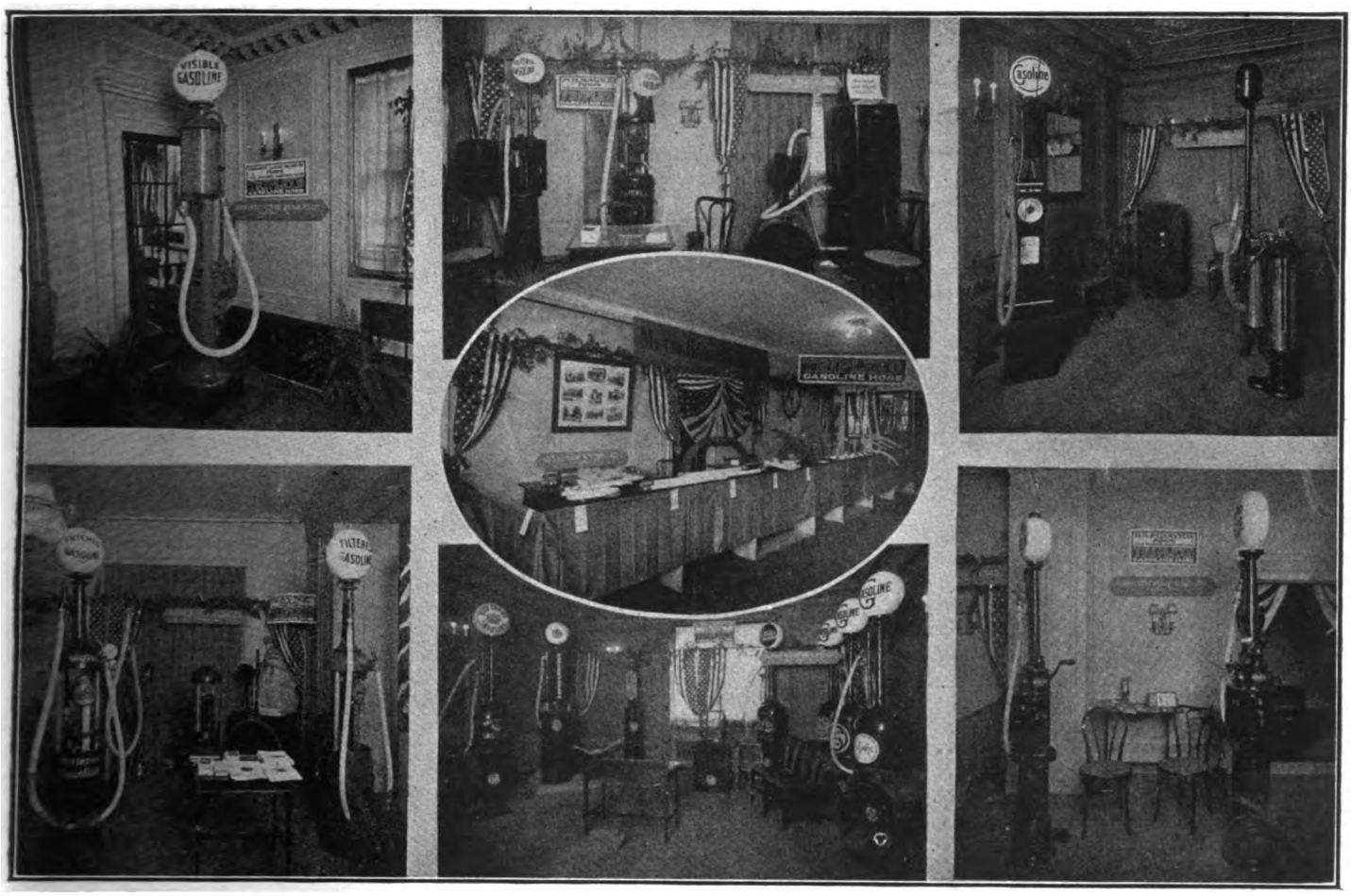
Included in this display were sections of all sizes of the special hose, Triplexd, which is produced exclusively by this company, which were shown in a great variety of complete lengths, and cut section that showed the construction to all who desired that information.

A section of a monster loading hose, such as has been ordered by the government for loading and unloading oil tank steamers, by gravity and by pumpage, was conspicuously shown in the center of the display, and close to it was a standard on which was an exhibit of filling station hose of all sizes.

In addition there was a display of large size loading and unloading hose for vessels, for tank cars and tank wagons, and filling station hose for every type of equipment. Among the exhibits was a length of Triplexd gasoline hose that had been sold more than three years before and had been used by the purchaser for three years, which was still in such excellent condition as to warrant the claim that it was still very serviceable.

In connection with the exhibit were demonstrations of the flexibility of the hose, the adjustment of connections, and the other details of use interesting to users of gasoline and oil hose. The exhibit was attended by a staff of salesmen qualified to afford every form of information desired by inquirers. Of the manufacturers of storage equipment making exhibition five of the six, or 83 per cent., displayed Triplexd gasoline hose as the standard furnished by them to purchasers of their products. The accompanying group of illustrations was made from photographs taken during the convention and show the exhibits of the different manufacturers of storage equipment, much of which is especially adapted for gasoline filling stations.

The Chandler Motor Co., Cleveland, O., is making preparations to resume the building of passenger cars after completing a very large order for tracklaying type tractors for the War Department.



Exhibits of Manufacturers of Gasoline and Oil Hose and Storage and Filling Station Equipment at the Annual Convention of the Independent Oil Men's Association at the Hotel Biltmore, New York City. Upper Left, Guarantee Liquid Measure Co., Rochester, N. Y.; Upper Center, Milwaukee Tank Works, Milwaukee, Wis.; Upper Right, S. F. Bowser & Co., Fort Wayne, Ind.; Center, Metal Hose and Tubing Co., Brooklyn, N. Y.; Lower Left, Wayne Oil Pump and Tank Co., Fort Wayne Ind.; Lower Center, Gilbert & Barker Manufacturing Co., Springfield, Mass.; Lower Right, Dayton Pump and Manufacturing Co., Dayton, O.

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Mack 7½-Ton Tractor and Fruehauf 12-Ton Semi-Trailer Used by the Detroit Creamery Co., Detroit, That Carries Capacity Loads and Is Driven 50 Miles a Day at a Cost of 30 Cents a Mile and 2½ Cents a Ton-Mile.

Semi-Trailer Shows Large Haulage Economies

Exceptional economies are obtained by the Detroit Creamery Co., Detroit, a concern doing a large business in dairy products, with a Mack 7½-ton tractor and a Fruehauf semi-trailer that has a load rating of 12 tons, which is believed one of the largest units used for highway haulage. The tractor is a standard type, having the usual driver's cab, and the semi-trailer is unusually large, having combination panel and rack sides with spaces about midway between the forward and rear sections that are fitted with stakes that are removable for loading or unloading.

The body can be used open, in the event that the loads are bulky, or it can be covered with a tarpaulin, as is shown in the accompanying illustration, for protection of the freight in the event of storm or extremes of temperature. There is ample space under the cover for handling a load.

The outfit is used for hauling milk between different stations in the city and is usually driven in work that necessitates straight hauls of six miles, or 12 miles to the round trip. In one direction the freight is 250 cans of milk, which weighs approximately 12 tons, and in the other the freight will average 4¼ tons, which is equivalent to a constant load of 8⅛ tons during the entire service time. The tractor makes four trips each way a day, or a total of 48 miles, and it hauls 65 tons of freight, or 390 ton miles.

The statement made by William Williams, superintendent for the company, shows that the cost of operation of record is 30 cents a mile, or $15 for the distance driven each day, and this may be assumed to cover every item of expense, although the statement "debited cost of operation" might imply that all is not included. The figures given by Mr. Williams for general information show the work done by the vehicle and the cost, and are as follows. Mr. Williams says: "We believe that the trailer transportation method is the most economical for either long or short hauls."

Number of trips per day	4
Number of miles per day	50
Tons handled one way	48
Tons handled on return	17
Average time per round trip, hours	2½
Debit cost of operation, per mile	30c
Miles per trip, loaded	6
Cost per trip	$1.80
Average load per trip, tons	12
Cost per ton per trip	15c
Cost per ton per mile	2½c

Hospital Ambulance with Emergency Equipment

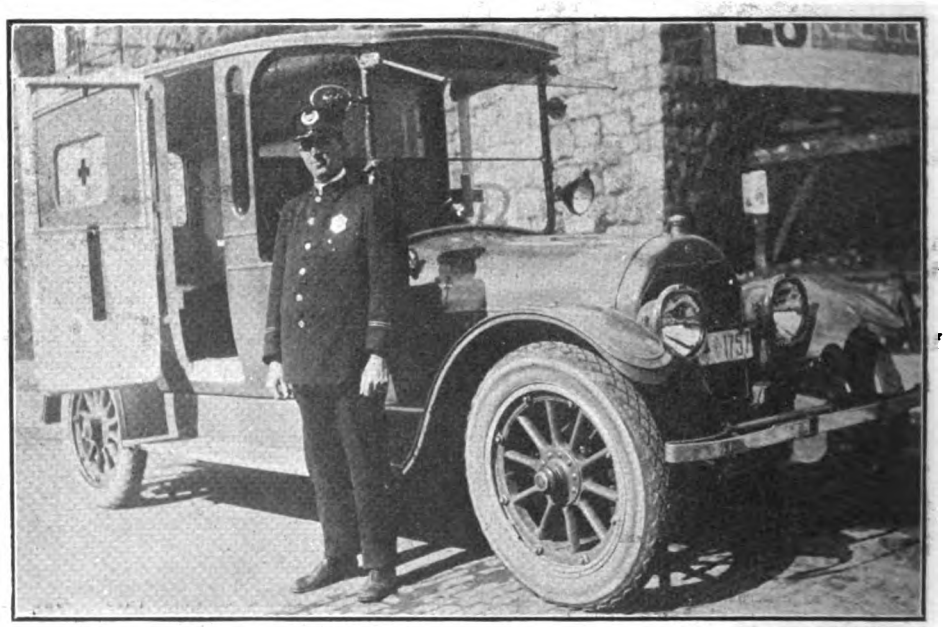
Designers of ambulance bodies have given in some instances much attention to the development of types that will make for the convenience of the driver and physician or attendant, and for the comfort of the patients. Cleanliness is extremely important, and aside from this requirement nearly all ambulances have been merely conveyances in which the attention given an occupant could be extremely limited, the supposition being that whatever was done would be emergent and would be incidental to thorough treatment at the hospital.

The Receiving Hospital at Los Angeles, Cal., a large institution where many accidentally hurt are treated, and which affords urgent medical attention for those who may be in need, has now in service what is said to be the finest ambulance ever built. The body is installed on a Cadillac chassis, which can be driven 70 miles an hour if speed is demanded by the condition of the patients, and it is equipped with a lavatory, with hot and cold water, so that the physician accompanying it can perform whatever surgical work he may deem best. There is an electric fan to lower temperatures if necessary and an electric heater to increase them when desirable.

Considerable ingenuity was exercised to equip the body. The water is heated almost instantly by driving the exhaust from the engine through a coil, and the electrical equipment has been increased in size to afford power for heating and for driving the fan. The body is entered at the side or at the rear, and the steps are a folding type that are dropped as the doors are opened, but at other times are out of sight in the body structure.

F. E. Pierce, who was formerly advertising manager of the Anderson Electric Car Co., Detroit, has been appointed district manager for the Elwell-Parker Electric Co., manufacturer of industrial trucks and tractors. His headquarters are at Detroit. The company's factories are located in Detroit and Cleveland.

Roger J. Gilmore, who has been vice president of the Packard Motor Car Co. of New York, has been elected president of the company, succeeding Emlen S. Hare, who has been elected executive vice president of the parent company.

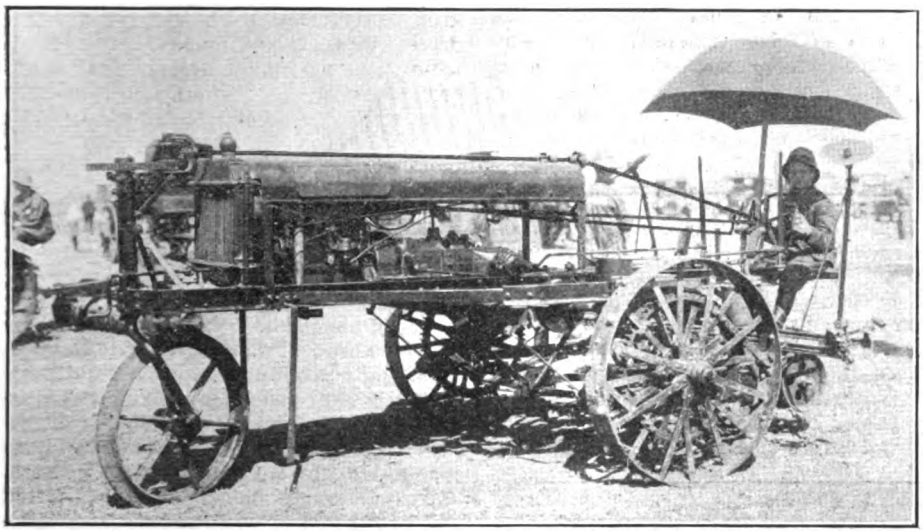


Cadillac Chassis and Ambulance Body, in Service of the Receiving Hospitals, Los Angeles, Cal., Equipped with Lavatory and Hot and Cold Water, Electric Fan and Electric Heating. Said to Be the Most Complete Vehicle of the Kind Ever Built.

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EXTENDED TRACTOR CONTROL

Means for Driving Machines from the Seats of Animal Implements So That One Man Can Operate Them Singly or Grouped.



Avery Motor Cultivator with Control Members Extended by Long Linkage, a Design Applied to Operation of Animal Drawn Implements for One-Man Operation.

AGRICULTURAL operations are the greatest source of wealth in the United States, and in the world for that matter. Few seem to realize that each day each person must eat, the food differing widely in character, and that aside from that taken from the sea all must be grown. The volume of food each person requires to sustain life may represent a seemingly small value, but the aggregate for the year is a considerable sum. And when is added to this more costly foods and luxuries the cost per capita increases rapidly.

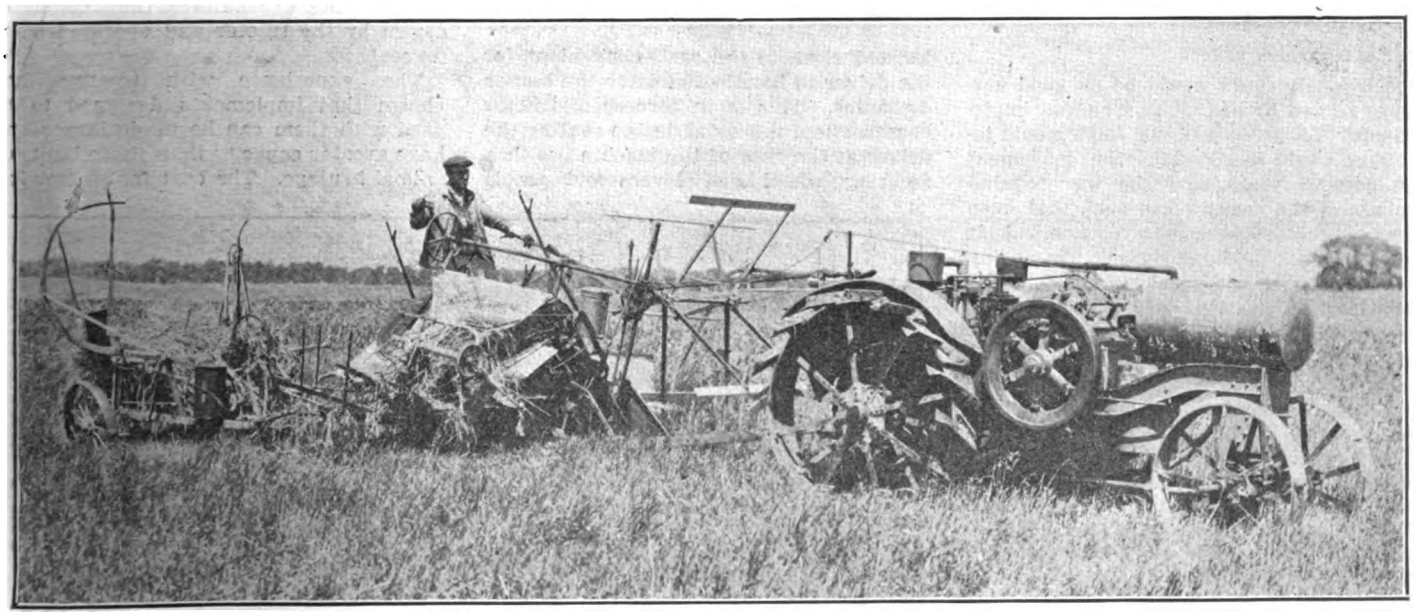
In America, both in the United States and Canada, land has been cheap and labor relatively high, which is the reverse of conditions in Europe. For the purposes of this brief article other countries need not be considered. With cheap labor and costly land the operations have been more intensive. This applies to Europe as a rule, aside from Russia, where food is produced on small areas that could not be worked as economically with power and large implements. In the United States, where large tracts are cultivated, the tendency has been to utilize machines wherever possible, the yield in bushels per acre being smaller, but much higher than in Europe when measured by labor units.

So in America the manufacture of farm implements and tools has been specialized, designs have been standardized and machines have been produced in large numbers. Some concerns have developed to vast proportions, operating numerous plants and having many branches, not only in this country, but abroad, and these have carefully perfected sales organizations that have thousands of representatives.

Farm Machinery Built for Horse Work.

Until the beginning of the war in Europe power farming in this country was not general. True, a good many thousand tractors had been sold, but these were comparatively few when the total of farm operators was considered. But with rare exceptions every farmer who cultivated even small areas had machines and implements designed for use with animal power. As the demand upon this country for food increased the endeavor of the farmers was to meet this so far as possible because of the expectation of larger prices. To produce larger crops additional farm machinery was necessary. Tractors were bought very generally, there being a demand in excess of the production of the industry. With rare exceptions, however, the machinery is a type constructed for animal haulage, there being very little built especially adapted for tractor work.

Today probably 99 per cent. of the



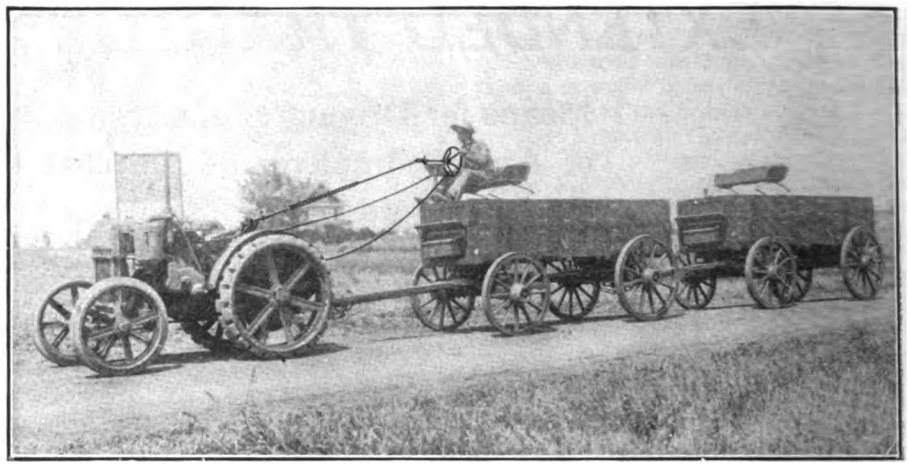
Titan Tractor Drawing a Deering Seven-Foot Binder Equipped with Automatic Shocker and Tractor Control, the Driver Operating the Tractor from the Binder Seat—With This Equipment the Machine and Implement Becomes a One-Man Outfit and Does Thoroughly Satisfactory Work.

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farm machinery in use was designed for work with horses or mules. In fact, not until a few months ago did the manufacturers of tractors realize that better results could be obtained with implements constructed for tractor haulage. During the past year a number of tractor builders have formed what may be regarded as cooperative relations with implement concerns to produce types that are adapted by design for work with the machines they build. Several of them have gone so far as to condition that their tractors will only be sold for use with certain machines that are specified.

Horse Machinery Is Serviceable.

While there is no desire to criticise this policy, which is stated will insure to the tractor owner the largest productivity and the greatest degree of satisfaction with his machine, the fact remains that practically all the tools and implements now owned by farmers, and probably a very large part of these are nearly as serviceable as when new, must be utilized, or there will be enormous sacrifice. In fact, were animal farm machinery discarded the nation could raise food crops that would probably feed its population for a few days only.



Adjustable Control Extension Designed by Operating Case Tractors and Animal Drawn Vehicles or Implements, Elevated to Drive a Train of Farm Wagons from the Seat of the Forward Unit.



Tractor in Municipal Service: Case Machine, Built for Farm Work, Operated with a Road Scraper for Street Grading.

Obviously there would be no good purpose served by abandoning animal implements. Large as it is, the implements industry could not replace the equipment in use for years, and the war requirements of the country are such that even were such replacement economical it would be out of the question. This being so the owners of animal machinery must continue to utilize it. Not only this, as there will be greater shortage of man power than now exists, this machinery must be used to obtain the most intensive results that are practically possible.

Must Equip Tractors to Use Horse Tools.

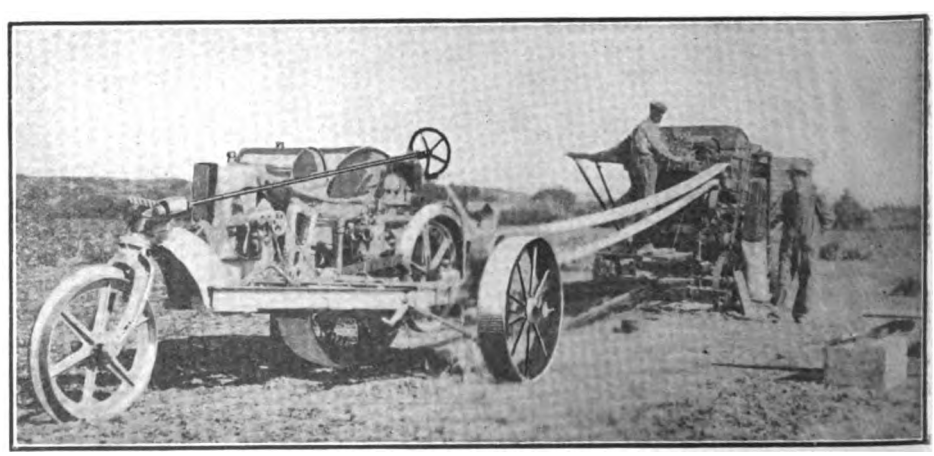
There is no question that women can operate farm machinery and farm implements with surprising degree of efficiency, and about the only practical possibility to compensate for absence of men is to utilize tractors. There will be thousands of tractors more than are now available, and these must be equipped so that they can be used with animal implements.

There is hardly necessity of explanation that animals usually draw farm machinery, the driver generally being seated on the implement. This position is necessary from the fact that horses must be guided and the operation must be by control levers or other members that are located close to the seat, convenient for the driver to handle and drive the horses or mules. This is in reverse of tractor construction, the usual design seating the driver at the rear of the machine, with a steering wheel and levers and pedals grouped about him. The tractor must be driven ahead of the implements, and as handling a machine in average field work requires skill and strength and quick action, when an animal machine is drawn by a tractor one man must "ride" it to handle the levers and watch the work. There are some machines that are lifted by power and others that are semi-automatic, so that these can be operated by the tractor driver, but these types are comparatively few.

Cannot Convert Animal Machines.

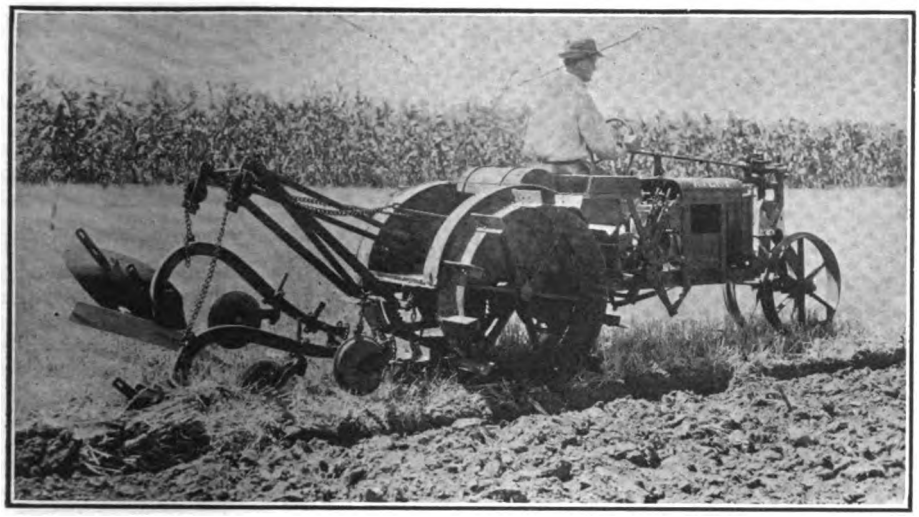
The animal machinery might possibly be reconstructed or adapted so that it could be worked with control from the seat of the tractor driver, but such reconstruction would be more or less experimental, would be costly and results would probably not be as satisfactory as with the original. But assuming that the machines could be converted, such conversion would be with more or less complications, so that they would have neither added value nor greater utility, and the only real advantage would be that for the expenditure they could be drawn by the tractor and operated from its seat.

The experience with tractors has shown that implements designed to be used with them can be made larger and have greater capacity than those built for animal haulage. The cost for tractor im-



Bull Tractor Threshing Beans, Owned by D. J. McMurty, Wrroyo Grande, San Louis Obispo County, Cal., Contracting Bean Thresher.

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An Avery Tractor Working with a Two-Plow Gang in Stubble, This Showing One Plow Raised to Illustrate Control.

plements is necessarily more, but the work done with them is proportionately increased. With machines that have ample power two or more horse machines can be coupled and driven, which practically doubles the capacity, but if one or more of these machines must carry a man to operate them the cost is not greatly decreased. Of course the purpose is to do more work for a given expense or decrease the cost of a given work, and this is not always possible, or at least to such a degree as to justify a change.

Will Use Tractors Wherever Possible.

The average farmer operating a considerable area has more or less machinery that has nearly if not the original service value, and economy and other factors justifies the use of this. The tractor is desirable because of its far greater utility and that with it work can be done almost continuously. This conclusion is unquestioned. The cost of horses and their maintenance has so greatly increased that there is, considering their limitations, every reason why their number should be reduced to a minimum.

With a view of utilizing animal machines with tractors, and having the same control as when worked with horses, some engineers have designed extensions of tractor control members so that they may be driven and operated from the seat of one of the machines hauled. These extensions are so constructed that they can be quickly attached to or detached from the tractors and with them machines can be steered, the ignition and fuel systems regulated, the brakes applied and any other essential to operation controlled quite as surely as though the driver were on the tractor.

Extension of Tractor Control Members.

The object of the designers of such equipment is to extend the steering column with substantial support whatever distance back of the tractor is necessary to be convenient to the driver rising on the machine, and in combination with this is a system of rod linkage or pull ropes by which the other members can be moved. Some of these have admirably developed methods of lever regulation, so that these may be adjusted as closely as when handled at the driver's seat, and statement is made that there is no uncertainty in driving the machines, either on the road or in the field, or on rough ground, or in highway traffic.

The extension of control members appears to be practical with a very large number of machines, but there must of necessity be variance because of the difference in the designs. The fact that they can be attached or detached, to meet the operating condition, and that there is no uncertainty in handling the tractors is a strong recommendation for such equipment. One of the accompanying illustrations shows an Avery 5-10 horsepower tractor with an extension of the control so that the driver can operate it from the seat of the machine it draws.

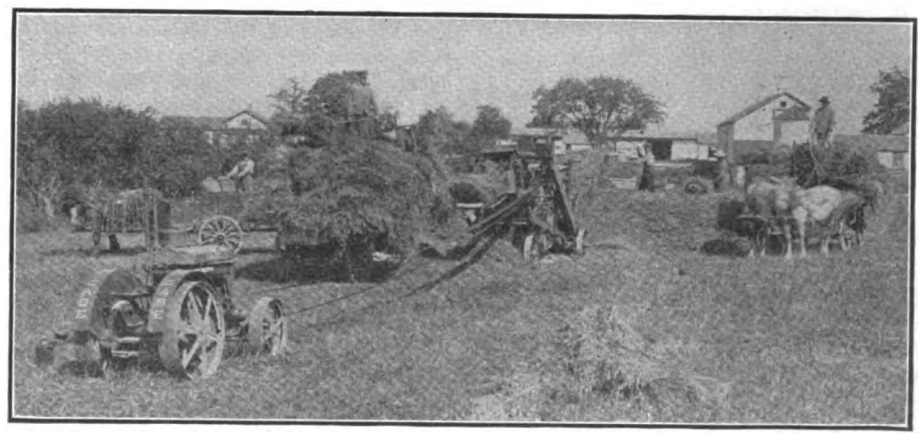
Different Types of Tractor Control.

Another illustration is of a Case tractor hauling two farm wagons coupled to it, the driver operating the train by the extension of the control members so that it is directly ahead of and convenient to him, the wheel being elevated to the height of the wagon seat. He has practically the same position he would have if driving horses. Probably the wagons could be drawn quite as well by a tractor with the driver seated on it, but the purpose was to demonstrate the practical control of such a train. This extension was designed by Case engineers for using animal mowers, binders and other farm machinery, where the drawn implement must have an operator on it to make adjustments and regulate it to meet the varying conditions of crop, field surface or soil, which adjustments cannot be made by the tractor driver. The extension allows the driver to ride on the machine so that he can watch the work. It is simply a means of utilizing animal machines by practically controling the tractor as one would horses.

Another illustration shows an IHC Titan tractor hauling a seven-foot Deering binder equipped with an automatic shocker, the driver operating the outfit from the seat of the binder by the extension or "tractor control," which has been thoroughly proven and found to give satisfactory service. This again emphasizes the economy of having the driver handle both machines by the "tractor control," which saves the labor of one man.

One illustration is of a Waterloo Boy tractor drawing a train of three farm wagons, which was operated between the headquarters of Deere & Co., at Salina, Kan., during the recent farming demonstration at that city, and the field where the machines were worked. The wagons were fitted with stub poles and coupled by a long chain, the pole of the leading wagon being attached to the drawbar of the tractor. The coupling was extremely simple and could be imitated for very little expense by any farmer with ordinary tools. The train tracked perfectly and was well within the control of the driver of the tractor. This outfit was utilized to prove the possibilities of using farm wagons for trailers for tractor haulage on highways, and the results were extremely convincing. The wagons were freighted with from 40 to 60 persons each trip, which was a comparatively light load for the tractor. On average country highways the tractor ought to draw from 10 to 20 tons, according to surface conditions and grades.

W. B. Seelig has resigned as secretary of the Chicago Pneumatic Tool Co. and has been succeeded by H. D. Megary.



Operating Combination Equipment on a Western Farm the Case Tractor Serving as a Power Plant and the Animals and Wagons Bringing the Harvested Crop to the Thresher and Hauling Away the Sacked or Bulk Grain.

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MEXICO WANTS AUTOMOTIVE VEHICLES BADLY.

Mexico is a land practically without good highways and it is cursed with cheap labor, so that there is lacking in that country as a market two of the principal incentives for the use of automobile vehicles and power farm equipment But the economies of cars, trucks, tractors and, of course, farm implements that can be used with tractors, have so impressed the Mexican government that it has suspended all import duties on these for a period of a year.

This fact is important to tractor and truck manufacturers, as well as to implement producers, for with Mexico open to exploitation a great deal of interest could be created and no doubt a substantial foundation could be laid for future profitable transactions. The fact that the roads are poor is not an obstacle to the sale of automobile vehicles. Those of the United States as a whole are not comparable with Western Europe, but there are less than 500,000 machines in use in Europe as against at least 5,500,000 in this country. Good roads can only come when the people realize the necessity and economy of constructing them.

FLINT WILL GIVE SITE FOR GENERAL MOTORS PLANT.

The Board of Commerce of Flint, Mich., has offered to purchase and present to the General Motors Corporation a large area of property on the east side of the city suitable for the site of a manufactory, provided that the corporation will locate in that city a proposed plant that will afford employment to several thousands of men. As yet no reply has been made to the Board of Commerce by the corporation.

VICTORY COMPANY ACQUIRES GIBSON-HOLLISTER.

The Victory Manufacturing Co., Thompsonville, Conn., has acquired by purchase the assets and patents of the Gibson-Hollister Co., Springfield and Boston, Mass., and the plant of the Upson-Martin Co., Thompsonville, at which it will manufacture spark plugs for tractors and trucks, the Croxford rim tool and electrical specialties. The company will have production well under way by the first of the year.

DUPONT MEN JOIN GENERAL MOTORS COMPANIES.

Frank Turner of Wilmington, Del., formerly comptroller for the DuPont company, has been appointed comptroller of the Buick Motor Co., Flint, Mich., and E. W. Proctor, also of Wilmington, has been made assistant treasurer of the same company. Mr. Turner's predecessor, L. L. Ohland, has been sent to a new position in the office of the General Motors Corporation, in New York City, and J. N. Ryan, former assistant treasurer, has resigned.

Willys Optimistic of the Automotive Industry.

According to John N. Willys, head of the Willys-Overland Co., who also controls the Moline Plow Co., builder of Moline tractors, plows and farming implements, and also the principal owner of the New Process Gear Co., Syracuse, N. Y., there is every reason for belief that the coming year will be very prosperous for the automotive industry. He is also greatly interested in the airplane industry as president of the Curtiss Aeroplane and Motor Corporation.

He believes that during the next year there will be very great progress made in airplane production, and that there will be regular passenger service established between America and Europe by hydro-airplanes, which will carry passengers, mails and even express matter.

He is of the opinon that American automobile vehicle manufacturers have a good year ahead of them, as all or nearly all of the vehicle plants will be back to pre-war production by the coming summer, and, if there is endeavor made, can be producing machines to full capacity providing materials can be obtained.

According to his information the plants of his companies at Toledo, O.; Elmira and Pontiac, Mich., ought to be producing to 100 per cent. by early spring. The intention is to complete the munition contracts as early as is possible and increase the output of vehicles as fast as materials can be obtained. A little time will be necessary to make the transition from war to peace production, but there ought to be less disruption than was caused by the conversion from a peace to a war production.

He stated that he expected the Toledo plant to be up to a 75 per cent. production of automobiles by Jan. 1, and arrangements have been made to carry out the conversion with as little interruption as is possible.

The purchase of the controlling interest of the Moline Plow Co. by the Willys-Overland Co. was especially opportune. There will be a tremendous demand for farm tractors, both in the United States and Europe, and the Moline plant is already more than 9000 tractors behind orders. The machinery and tools for building engines are now being installed in the Toledo plant as rapidly as these can be obtained, and the purpose is to make the tractor engine department a regular part of the big Toledo factory.

GREENE JOINS WETMORE-SAVAGE.

P. H. Greene, who for several years served in an executive capacity with the Motor Car Equipment Co., Boston, Mass., has resigned from that association to become associate manager of the automobile equipment department of the Wetmore-Savage Co. of that city. Mr. Greene is widely known to the New England trade.

S. A. E. ANNUAL MEETING TO BE IN NEW YORK, FEB. 4-6.

The annual meeting of the Society of Automobile Engineers, to take place in New York City, Feb. 4-6, will be given over to a general observance of the end of the war, and the sessions generally will be devoted to the consideration of war and post war subjects. One of the features of the meeting will be showing of scenes in which the central figures are men who have been actively engaged in the war with the American and Allied armies, and in connection with these will be statement of activities and personal accomplishments that have not as yet been told of.

There will be consideration of scientific subjects of all kinds relating to the automotive industry, which will include fuel development, thermo-dynamics of internal explosion engines, construction and operation of war tanks, different types of automobiles developed for war and for general use, radial type aeronautic engines, farm and road tractors, and other productions of interest.

The commercial possibilities of recent intensive work with aircraft engines will be dealt with, and the results of observations of the uses made of power trucks will be considered at considerable length. Another subject will be the development of power driven boats for naval patrol service, and still another will be consideration of the perfection of engines for automobile and farm purposes. One of the events of the meeting will be a dinner that will take place the evening of Feb. 6 at the Hotel Astor. There is reason to believe that the sessions will be the largest in point of attendance in the history of the organization.

COLT CHAIRMAN OF BOARD OF U. S. RUBBER.

Col. Samuel P. Colt, for 18 years president of the United States Rubber Co., the largest manufacturer of rubber products in the world, with subsidiary companies in different sections of the country, has declined to serve longer in that capacity and at the last annual meeting of the directors, following the meeting of the stockholders, was elected chairman of the board of directors. Lester Leland, for a long period vice president of the company, was elected vice chairman of the board. Charles B. Seger, for two years a member of the board of directors and the executive committee, was elected president. He is connected with Kuhn, Loeb & Co., one of the largest banking concerns of the country, and previously to that connection was associated with several railroad companies.

COOKE ADVERTISING MANAGER FOR DENBY TRUCK.

The Denby Motor Truck Co., Detroit, has appointed as its advertising manager Frank S. Cooke, who was for a long time connected with the Detroit Free Press and who is widely known as a writer on sporting subjects.

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JACOBY AND BELDEN OVERLAND VICE PRESIDENTS.

Kelly R. Jacoby and Edward H. Belden have been elected vice presidents of the Willys-Overland Co., the former in charge of engineering. Both have been connected with the company for considerable periods. Jacoby was previously general manager of the Miami Cycle and Manufacturing Co., Middletown, O., and went to the Overland company first as director of service. Later he was made assistant sales manager and more recently assistant to C. A. Earl, first vice president. Mr. Belden is known as the inventor of the Belden transmission gearset for automobile vehicles, and after engaging in manufacture of this invention he joined the Packard Motor Car Co. as a body engineer. Two years ago he went to the Overland company as director of its engineering department.

FUEL ADMINISTRATION LIFTS OIL INDUSTRY CONTROL.

Announcement has been made by the United States Fuel Administration that it has asked the oil industry to suspend all voluntary restrictions on crude oil prices and distribution and on refined products. This is regarded as releasing from government supervision all the industry, both crude and refined, which will be permanent unless, according to the statement, "events prove the necessity of again exercising control." The industry is reminded that all licenses now outstanding will remain effective until the President makes proclamation of peace, and that all agreements will continue subject to cancellation or assignment at the request of the fuel administrator. He, however, does not expect to have to exercise this authority.

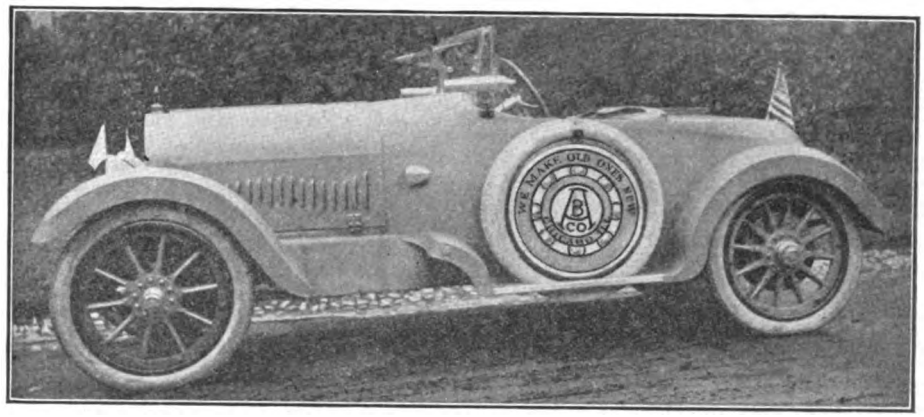
CANCELLATION OF CONTRACTS BY AUTOMOTIVE INDUSTRY.

There is every reason to believe that there will be friendly cooperation in the cancellation of contracts by the War Department and different concerns of the automotive industry. This was practically assured at a conference of the War Industries Board and representatives of upwards of 125 builders of trucks and cars.

According to Hugh Chalmers of the war service committee of the automotive industry the industry itself and the trade representing it will be one of the first to be restored to a peace basis, and, in his opinion, this ought to be realized by June 1.

ALL PLEDGES FOR TRUCK SALES ARE DISCONTINUED.

All manufacturers and dealers in trucks have been relieved of the necessity of exacting pledges from buyers of vehicles that the machines are to be used for essential purposes, and there has been discontinuance of the order by the priorities division of the War Industries Board establishing what industries may be regarded as essential, and to which sales might be made.



The "Bender Special," a Roadster Built at Chicago and Equipped Throughout with Ahlberg Remade Bearings.

AHLBERG REMADE BEARINGS IN "BENDER SPECIAL."

The utilization of what had been for years regarded as unserviceable and valueless is the foundation of the business of the Ahlberg Bearing Co., Chicago, a concern that restores worn bearings of all kinds so that their service life is practically doubled. These are exchanged for bearings that are useless upon payment of a comparatively small sum, the system of exchange and restoration being continued, so that automobile vehicle owners may obtain what is practically initial efficiency and greatly lengthen the service of their machines for minimum expenditure.

The company has designed what is regarded as one of the most unique passenger cars to be seen in Chicago boulevards that is known as the "Bender Special." This is a roadster that can be driven 70 miles an hour, in which is a Buda four-cylinder engine that is equipped with a high-tension magneto for ignition current. It is equipped with electric lights under the hood and in the tool box and the horn is operated by a foot pedal, as is a fuel supply accelerator. The machine is fitted throughout with Ahlberg remade ball bearings, which demonstrates the mechanical value of the restoration processes of the Ahlberg company.

SOME TRUCK WAR CONTRACTS TO BE COMPLETED.

Because the Postoffice Department has increased the number of power trucks that it proposes to utilize in the collection and distribution of mail from 10,500 to 15,700, there is reason to believe that the contracts made by the War Department, which will eventually turn the trucks over to the Postoffice Department, will be filled by the contractors. These are said to be the Packard Motor Car Co., the Pierce-Arrow Motor Car Co., the Locomobile Co. of America, the Garford Motor Truck Co. and the White Co. The building of these trucks will keep the production departments of these concerns running for varying periods. There is said to be little probability that the War Department will return trucks used by the War Department army in France to this country.

RUMOR OF FORD PLANT SALE NOT CONFIRMED.

Statements concerning the future of the big plant of the Ford Motor Co., at Highland Park, Detroit, have been given more or less credence of late, but these have been denied by E. G. Liebold, secretary to Henry Ford, and are seemingly based on the observations of those who have no real knowledge of Mr. Ford's affairs.

One rumor was to the effect that the plant was to be disposed of to the General Motors Corporation, and new factories erected at the River Rouge, close to the big blast furnaces developed by Ford to produce steel direct from iron ore. The property holdings of Mr. Ford on the River Rouge are very large and almost unlimited possibilities obtain for industrial expansion were this contemplated.

Building the Ford plant cost millions, and to replace it at the prices of labor and material today, to say nothing of equipment, would mean an enormous expenditure. There is no reason to believe the rumors, but there may be some basis for them. In any event there is little probability that such a large industrial change will be undertaken until the industry has adjusted itself to what may be regarded as a peace basis.

DENBY EXPORT OFFICE OPENED AT NEW YORK.

The Denby Motor Truck Co., Detroit, has established an export office in New York City, which has been placed in charge of G. W. Worden, who until the opening of this office directed the exportations from the main office at Detroit. The business had so much increased and there was so much need of representation nearer the principal shipping port of America that the change was made.

POWER VEHICLE SHIPMENTS SHOW BIG LOSSES.

The losses through the curtailment of production of the automotive industry are best reflected by the shipments from the factories, which were 6201 carloads in November, as against 18,942 in the same month last year. In October the factories shipped 8214 carloads, as against 21,403 in October of 1917.

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MATHEY BROS., Inc., SOLID TIRE SERVICE



A. Edward Mathey, Originator of Dealing in "Used Truck Tires" and Manager of the Boston Branch.

AFFORDING tire service on a different basis than any other concern in the country, Mathey Bros., Inc., Boston, Providence and New York, has developed a business of large proportions in a very short period. The company defines its operations as "tire jobbing," but it is not engaged in "jobbing" in the generally accepted sense, for it is supplying equipment to buyers at prices that are not governed by prevailing market values, and affording a service to truck owners that is guaranteed to give satisfaction.

The concern is incorporated under the Massachusetts laws by A. Edward Mathey and F. A. Mathey. The Mathey brothers have had much experience with tire manufacturing, selling and service, being with some of the best known concerns and in business for more than 10 years. Edward A. has been associated with the Kelly-Springfield Tire Co., the Diamond Rubber Co., the Firestone Tire and Rubber Co., the Hartford Rubber Works Co., the Swinehart Tire and Rubber Co., and the Gibney Tire and Rubber Co., and F. A. was with the Kelly-Springfield Tire Co. and was engaged in business as a tire dealer at Manchester, N. H., for six years.

The present business was developed by Edward A. Mathey, who was in charge of a service station operated by a tire company in Boston. He had to deal with truck owners and drivers and realized that tire service meant much to them. He was impressed by the actual loss to truck owners in tires on machines that were "junked." Trucks that were in such mechanical condition that they were beyond practical restoration were usually disposed of for small prices, the chief value to the buyers being what they might obtain for metal scrap or the occasional sale of parts.

Tires Sold as Junk a Direct Loss.

But whether or not the trucks could be moved by their own power, or were valueless for freightage, practically all had tires, ranging in condition from nearly new to well worn. These tires had varying service life remaining, and generally the guaranteed mileage had not been reached. Invariably the tires were sold with the trucks to junk men, which was direct loss to the owners, for their condition added little if any to the values fixed by the buyers. With the purpose of increasing his income Mr. Mathey bought all tires he believed were saleable, pressed them from the wheels and sold them as "used solid truck tires." In a short time he found that he could sell all the tires he could obtain and he decided to devote his time exclusively to "used tire jobbing."

In August, 1917, he resigned his work and established himself in a store at 62 Sudbury street, where he had desk room, a telephone and storage space for perhaps 50 tires. He advertised in a small way locally that he dealt in "Used Solid Truck Tires," and very rapidly developed patronage. He could sell for from $20 to $25 a tire that was actually worth in service life from $45 to $90, and he guaranteed to give to customers more miles for the dollar than they could obtain from new tires, which was proven to be true in almost every instance.

He found that truck owners were looking for tire economy and were willing to



A Section of the Stock Room of Mathey Bros., Inc., at 76 Cummington Street, Boston, Where 3000 or More Tires Are Usually on Hand.



F. A. Mathey, Manager of the New York Branch of Mathey Bros., Inc.

accept used tires on the basis they were sold, understanding they were taking the judgment of a business man who advised them conservatively and expected to have them continue as customers. Soon Mr. Mathey's big problem was obtaining tires, for the demand exceeded the sources of supply then available and much time was necessary in visiting junk men and buyers of unserviceable trucks and buying shoes that might be saleable.

Press of Business Established Company.

He made a proposition to his brother to join with him in business and a partnership was formed, F. A. Mathey undertaking the office work and stock room selling, while A. Edward Mathey solicited business from owners and bought tires wherever they could be found. This made a very practical combination, but the business was small and was confined to Boston and its suburbs.

Then opportunity "knocked." A concern that had manufactured truck tires for years was bought by a large company that until that time had not manufactured a solid tire. The buying company, which purposed to continue manufacturing solid tires under its own name in the plant it had purchased, wanted to dispose of the tires it had acquired in the merger, so that it could begin business with its own trade marked products, and it offered all of the stock for sale at a price that was much lower than the prevailing market value.

Bought Direct from Factories.

This was a real proposition, for the price was for all the tires at the factory, about 1600, and necessitated a large investment. The tires were all fresh made and there were comparatively few that were not first quality. This was the initial handling of new tires, and as these had been bought so they could be sold considerably below the prices they would have brought in normal conditions, a different selling plan was necessary. There was no disposition to discontinue dealing in used tires, but there were numerous opportunities to obtain tires that were slightly imperfect. One of the chief causes of tire imperfection is what is known as "mould blemish," because of

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the tread or side adhering to the mould while curing, causing marks or scars that do not lessen the wearing quality, but detract from the appearance and value in the mind of the average buyer.

Blemished Tires Generally Good.

Such tires are put aside by inspectors. They cannot be sold for standard prices, and there would be considerable loss were the manufacturers to "scrap" and reclaim them, so the factories generally sell these for what may be termed "best offers," the buyers disposing of them after the names of the makers have been removed. There are no guarantees with such tires unless the buyers will assume responsibility for wear. Usually such tires are sold "as is" and truck owners purchasing them expect to pay comparatively lower prices if they are not guaranteed mileage.

Besides what may be classed as "blemished" tires, discontinued styles and sizes and occasionally surplus stock are sold by manufacturers, and the tires are bought by dealers who expect to "job" them. The greater part of these tires are standard from every point of view, but not guaranteed, and are sold without the name and trade marks of the makers. Handling tires that might in trade parlance be termed "seconds" has been engaged in for years, but these had always been sold by dealers who bought from jobbers, and there was no assumption of responsibility and no attempt to afford service.

Demand for Tire Service.

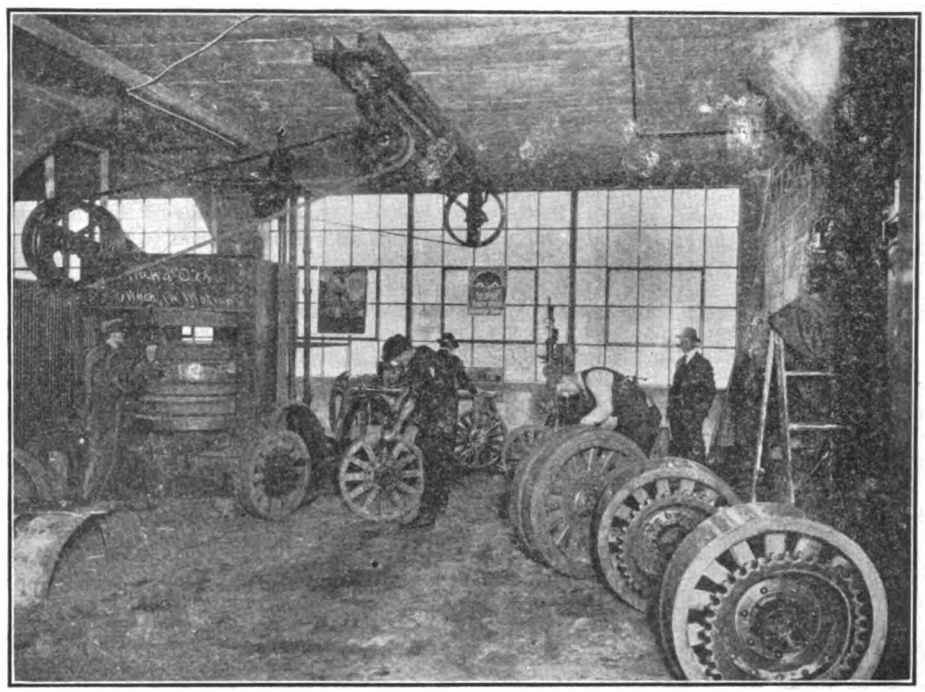
Mathey Bros. believed that by operating a tire service station in connection with their business they would attract more customers, and that they could retain them by fair dealings and insuring full values for the prices paid. This would increase the market for tires. The chief inducement for customers would be the low prices and the character of the service.

While the project to establish a service station was under consideration the company had opportunity to buy a car load of tires, which was taken advantage of. Next a contract was made to take from one of the largest tire companies all overstock, discontinued styles, types, government rejects and blemished stock, and a month later a similar contract was made with another company. Mathey Bros. is now receiving about 600 tires a month from three different factories and the market for these has steadily increased.

Larger Quarters in Boston.

Having insured a certain supply of tires the company removed from Sudbury street to 76 Cummington street, where a lease was made for sales and stock rooms having a floor area of more than 5000 square feet, and a service station was established that has equipment for handling every type and size of truck tire made. The service station was operated practically continuous, or at least all of the time necessary to meet the requirements of customers, and a campaign was begun to attract business from truck owners within a radius of about 50 miles of Boston. This campaign was very successful and the company determined to establish a branch in Providence. The patronage at this branch was such that the company next established a branch in New York City at 506-508 West 45th street, and with it an up-to-date day and night service station.

While the fact that the company sells tires at prices that are lower than the market prices for standard makes, types and sizes has attracted buyers, the service to truck owners is intended to afford a very large time economy. Though the condition of tires can be easily observed, the general desire of owners is to obtain the greatest possible mileage and replacement is seldom made until the need is imperative. Renewals ought to be made as a rule before the tires are worn close to the rims because the main protection of the truck mechanism is the cushion between the rims of the wheels and the highways. Where the vehicles are used on smooth surfaces, such as asphalt, there is less deterioration than on other surfacings.



Part of the Boston Service Station of Mathey Bros., Inc., Showing the 400-Ton Pressure Capacity Hydraulic Press Used for Demounting and Remounting Tires on Trucks.

Value of Quick Work to Owners.

Few truck owners want tire replacements made during working hours, for this would mean loss of service, and, of course, shrinkage in working time that might be productive. The continuous operation of the Mathey service stations is to do work during hours the machines would ordinarily be idle. But that there shall be as great time economy as is possible during business hours of the day equipment has been installed and methods have been devised for removal and replacement of tires of the pressed on type that are exceedingly attractive to truck owners. For instance, the Mathey shops have records of removing forward wheels, pressing off an old tire and installing a new tire, and remounting the wheel in seven minutes. The same work can be done with rear wheels and dual tires in 45 minutes. This may appear to be extremely rapid work, and statement is made that save in rare instances the time for tire changes will be approximately as specified. Such results, however, cannot be obtained save with well trained workers and special equipment.

With reference to service both of the Mathey brothers affirm that this is quite as important as supplying tires. The demountable type of tire was designed so that the owner of the truck could furnish his own service, buying the tire and having it shipped by express, or delivered, and then making the change, but fully 90 per cent. of the owners would drive miles to a station to have a demountable tire removed. On arrival there might be delay from other jobs in waiting. Largely from this reason the demountable tire was not an advantage to the owner.

Economy Necessitates Good Equipment.

Now that the pressed-on type of tire is installed by practically all vehicle manufacturers, the truck owner has to consider the possibility of delays, because of work to be done before he can be served. The tires must be removed by hydraulic presses, new tires installed, and the wheels demounted and remounted. Service can only be given by having equipment and men of experience to handle the work. The tire bases may be rusted to the wheel rims and the presses must be of capacity to exert extremely heavy pressure. The men must be trained to do their work systematically and efficiently, as Mr. Mathey puts it, as though the work were for a fire department and the vehicle was needed in the quickest time possible.

Service also depends upon the office force, which must see that the order is supplied the shop from the stock room. Time can be wasted surprisingly unless there is system and organization. The greasing is made without extra charge, as is the examination of the wheels for

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alignment and the condition of the axles. Much excessive wear of tires results from misalignment of the wheels and from sprung axles. Assuming a truck equipped with 36 by five-inch dual rear tires and the same size single tires forward. Should one of the rear tires fail generally two new shoes are installed. The one good tire may have several thousands miles wear, but it is generally "junked." The Mathey plan is to tag it with the customer's name and use it on a front wheel when needed. This is a considerable economy, for the used tire may give good service for a long time on a front wheel.

Some Features of "Mathey Service."

There is much to be said of shop equipment and its value to the customer. Truck wheels of largest size weigh as much as 1500 pounds each and two men are needed when using a chain hoist to lift them to the press tables. The Mathey service stations are equipped with means so that one man can handle the heaviest wheels and do it in much less time than two men can do the work. This is a big saving in cost and in time to all customers.

Out of town customers may ship wheels to the company by express and new tires will be installed and the wheels shipped back the same day, the company paying the express charge one way. Or, if there is a tire press in the vicinity of the customer's garage or place of business, tires can be shipped by express to them and local men can install them generally at a cost of $2 a tire. The company also has a stock of old but strong wheels, and should a wheel be received with a loose hub or otherwise in poor condition, the hub can be removed and placed in one of the stock wheels so that the truck owner can have returned a wheel that will give entirely satisfactory service at a very small cost compared with the purchase of a new wheel.

The Boston branch and service station is in charge of A. Edward Mathey, who has three salesmen in touch with truck owners. The New York branch is managed by F. A. Mathey, who has two outside salesmen, and the Providence branch is directed by C. A. Golden. The company intends to establish branches in Philadelphia and Chicago within a comparatively short time. The present stock carried in the three branches ranges from 7000 to 8000 tires of five different makes.

Much of the success of the company has been due to its consistent advertising to truck owners, and statement is made by it that in its advertising in MOTOR TRUCK it has developed business with customers as far south as Texas and as far west as the State of Washington. This also established the fact that the company has customers in all sections of the country.

A display of power trucks will take place Feb. 24-27 at South Bethlehem, Pa., at a show organized by the Lehigh Valley Auto Shows Co., of which J. L. Elliott is manager. The passenger car show will take place from Feb. 17 to 24.

The Motor Truck Association of Philadelphia, Pa., will hold a show in that city in March.

MORRIS WILL MANAGE BIG EXPORT BUSINESS.

Morris, Russell & Co., Ltd. of London, which has an office at 14 Church street, New York City, manufactures power vehicle parts and accessories and equipment, and distributes these through trade connections and branches in Paris, Moscow, Calcutta, Johannesburg and Sidney. It has planned to represent American manufacturers wherever it does business and to expand its sales organizations in all parts of the world. The belief of the company is that the automotive industry of the United States will resume business as rapidly as is possible, and that as all European manufacturers and dealers and owners will require large volume of parts and materials, its own organization would afford a means of meeting this demand quickly and without preliminary exploitation. The affairs of the company in America are in charge of Capt. A. S. F. Morris, managing director.

PACKARD COMPANY SEEKING FOREIGN TRADE MEN.

With keen realization of the possibilities of foreign trade the Packard Motor Car Co., Detroit, has begun the development of an organization that will be qualified to exploit the markets of other nations, and as rapidly as the service of desirable salesmen can be obtained they will be trained to assist men who are now in the field. The extent of the company's overseas trade campaign has not been stated, but there is reason to believe that it will be in every promising market. This is an example that the farm tractor and implement manufacturers should follow.

PEERLESS TURNING TO CAR AND TRUCK PRODUCTION.

The Peerless Motor Car Co., Cleveland, O., which for a considerable period was working its plant to capacity building trucks for the War Department, and producing various war munitions, expects to have its conversion plan so far advanced by Jan. 1 that it will be able to resume vehicle construction. The company was engaged in war work to 75 per cent. of its production for practically all the time the nation was at war.

DUNN GOES TO MOLINE PLOW CO.'S PLANT.

H. L. Dunn, who was assistant purchasing agent for the Willys-Overland Co. at the Toledo, O., plant, has been transferred to Moline, Ill., where he will be connected with the Moline Plow Co. One of the principal activities of this company is the production of farm tractors.

Up to Dec. 1 a total of 250,201 registration licenses has been issued in the State of Texas, according to the records of the State Highway Commission, this including 3250 motorcycles. The record also shows that 4188 motor vehicle dealers are engaged in business in the state.

WANT PATTERN AND TOOL PLANT AT LOUISVILLE.

Louisville, Ky., has what is known as the "Million Dollar Factory Fund of Louisville," which had been created for the purpose of attracting industrial concerns to that city. Tempton Aubuchon, general manager of the fund, announces that a special committee, composed of representatives of a number of large manufacturing concerns, has been authorized to negotiate with manufacturers of tools, dies, wood and metal patterns, with a view of locating a tool and pattern plant in the Louisville industrial district.

The need of such a concern is acute, statement being made that during the past few years 59 different metal working plants have greatly increased in proportions. The committee is now negotiating with several companies and may induce one to establish itself in Louisville or vicinity.

CONTINENTAL MUSKEKON PLANT BUSY.

Practically no change has been made by the Continental Motors Corporation at its Muskegon plant, which is devoted almost entirely to the production of truck engines, and, according to the officials of the corporation, there is no probability of changes affecting labor at this factory for a considerable time to come, as large domestic orders are to be filled. The cancellation of government orders at the Detroit plant necessitated partial suspension of operations in some departments, but adjustments are now in progress and production will probably be resumed at this factory within a reasonable period.

SEEKING AMERICAN TRADE CONNECTIONS.

J. B. Clarkson of Hope Gibbons Sons & J. B. Clarkson, Ltd., Wellington, New Zealand, wholesale dealer in power vehicles, motorcycles and accessories, with branches at Sidney, Melbourne, Brisbane, Perth, and agencies throughout Australia and New Zealand, is in America for the purpose of making distributor contracts to represent American mauufacturers and sales agents in Australia and New Zealand.

WINNINGHAM TO ENGAGE IN AGENCY ADVERTISING.

An advertising agency will shortly be established at 1148 Book Building, Detroit, Mich., by C. C. Winningham, who was formerly with the Hudson Motor Car Co. and for a considerable period was associated with the work of the War Labor Board at Washington. Mr. Winnington is widely known in the industry.

The Baker-R. & L. Co., Cleveland, O., manufacturer of electric trucks and tractors, has engaged R. W. Knowles, formerly chief engineer and factory superintendent of the Electric Products Co., Cleveland, as assistant to John T. Hertner, its chief engineer.

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NORTON ASSIGNED TO MOTOR TRANSPORT CORPS.

Following his return from France, where he was engaged in special work for the War Department, W. T. Norton, Jr., formerly chief engineer of the manufacturing division of the Selden Truck Sales Co., Rochester, N. Y., has been assigned to duty with the executive branch, Engineering Division, Motor Transport Corps, of the War Department.

Mr. Norton was a member of the standardization committee of the Society of Automobile Engineers, and upon entering the service he was succeeded by John R. Coleman, but he continues as consulting engineer for the company. Mr. Norton was one of the engineers who developed the class B army service truck.

WILLYS HEADS NEW PROCESS DIRECTORS.

John N. Willys has been elected chairman of the board of directors of the New Process Gear Co., Syracuse, N. Y., at a meeting at which the resignations of President T. W. Meachams, Vice President T. G. Meachams and Secretary and Assistant Treasurer J. F. S. Meachams were received and accepted. At this meeting Vice President J. Allen Smith was elected president, Vice President James E. Kepperly of the Willys-Overland Co. was elected vice president, and Purchasing Agent G. W. Tapper and C. A. Neracher, formerly chief engineer of the Willys-Overland Co., were elected directors.

FINANCES OF THE SMITH MOTOR TRUCK CO.

The voluntary petition in bankruptcy of the Smith Motor Truck Co., filed in the United States District Court at Chicago, show the liabilities to be $1,624,157 and the assets $414,434. The largest creditor is J. & W. Seligman, 1 Williams street, New York City, which advanced money to the amount of $290,000, which amount is unsecured. An unsecured claim for $85,000 is held by the Central Trust Co. of Illinois, and there are secured claims that aggregate $101,166.

GMC BUILT VEHICLES FOR WAR WORK WORTH $13,000,000.

Statement is made that the value of the vehicles built by the General Motors Corporation to fill orders for the government for war purposes totaled more than $13,000,000. The orders included 7111 army ambulances and 2400 trucks for use at aviation fields or camps, or 9511 machines in all, for which an average of $1367 was paid. This does not include all of the orders received by the subsidiary companies, and the aggregate of all was probably considerably in excess of the total stated.

The 11th annual show of the Milwaukee Automobile Dealers, Inc., will take place at the Auditorium in that city Jan. 24-30, which will be a display both of passenger cars and trucks.

STATES ASKED TO KEEP ROADS OPEN

ECONOMIES in highway transportation are regarded by the best business minds of the nation as being more essential now than during the war. The cessation of hostilities has necessitated industries being converted to what may be termed a peace basis as quickly as possible. There must be a period of industrial and commercial uncertainty, dependent upon the confidence of business men individually and collectively, and upon their energies and foresight; and there must be development of the greatest efficiency and the most exacting economy that the nation shall pass through this period of transition without loss from business depression or industrial retardation.

There is abundant foundation for the continuance of highway haulage by truck. This applies especially to what may be regarded as short hauls for railroads. The saving of time and labor and the greater satisfaction that will obtain by a door-to-door service is extremely important. The Council of National Defense, through its War Industries Board and the Highways Transport Committee, has undertaken to impress upon the people the necessity of using and developing service already inaugurated, and with the experience of last winter believes that road haulage can be more systematically and more economically maintained. This is borne out by the following statement issued by the Highways Transport Committee, which is authorized by the Council of National Defense:

"A definite program having to do with the solving of the snow removal problem as it may affect adequate highways transport during the coming winter has been formulated by the Highways Transport Committee of the Council of National Defense, and is now being sent out to those states in which this problem figures.

"This program is based upon the realization that if the post-war period of reconstruction, which includes as a vital part the movement of foodstuffs and other commodities over the highways, is to be made equal to the needs of the situation, every character of obstruction to such transportation must be anticipated and guarded against.

"With Food Administrator Hoover and Chairman Hurley of the United States Shipping Board now in Europe arranging for the distribution of America's quota of foodstuffs among the peoples of Europe, the importance of seeing that there is no delay in the movement once these products start from farm or mill to the seaboard, has caused the Highways Transport Committee to call upon its regional, state, district and county organizations to leave no stone unturned looking to the facilitation of such movement.

"The snow removal problem, therefore, probably the most vital from the standpoint of the efficient and continuous flow of commodities along the highways, will be given intensive study by the Highways Transport Committees of the state directly affected.

"To that end requests have been issued to the organizations in Massachusetts, Maine, Vermont, New Hampshire, Rhode Island, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, West Virginia, Ohio, Indiana, Kentucky, Michigan, Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska, South Dakota, North Dakota, Colorado, Wyoming, Montana, Idaho, Washington, Oregon, California and Nevada, that they give immediate attention to the following general subjects, outlined by Mr. Raymond Beck, field engineer, relating thereto:

"First—Of the powers of the state highway department or commission for removing snow. If such powers are not specifically covered by statutes, whether maintenance funds can be used in an emergency?

"Second—What cooperation and work can and will be undertaken by the counties and state?

"Third—What cooperation and work can and will be undertaken by the municipalities and state?

"Fourth—What snow removal machinery, such as scrapers, plows, etc., are available for use by state, county and municipalities?

"Fifth—What preliminary measures can be undertaken which will prevent the drifting of snow, such as location and erection of snow fences? Also, the change of rail, board, picket and hedge fences which check the currents of air during a snow storm, thus causing drifts to form, and removal of brush or weeds paralleling the road, which invariably causes drifts to form.

"Sixth—Attention by state highways department or commission, through its field organization and in cooperation with the State Highways Transport Committee, of physical conditions along the highways tending to cause drifts. Recommendations as to the best means of dealing with same by preventive methods.

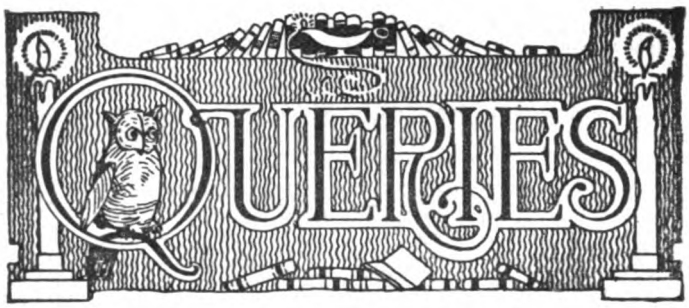
"Seventh—The making of snow removal report of every snow storm on such highways as are designated to be kept free from obstruction by snow so as to allow continuous essential highways transportation.

HOW AUTOMOTIVE INDUSTRY PRODUCED WAR WORK.

The full extent that the automotive industry profited through war work is little realized by the people as a whole, and naturally the workers shared in this prosperity to a very large degree. As an illustration the Nash Motors Corporation, Kenosha, Wis., filled contracts or delivered products valued in round figures at $37,000,000, and included in this was 12,502 completed Nash "Quad" trucks.

The Sanford Motor Truck Co., Syracuse, N. Y., has made agency contracts with the following: Armand R. Vanesse, Anthony, R. I.; Frank Crook, Pawtucket, R. I.; Roscoe Benjamin, Winsted, Conn.; C. W. Perkins, New Milford, Conn.; Herr Bros., Quarryville, Pa.; Jones Auto Co., Willimantic, Conn.; A. J. Schnell, Scranton, Pa., and the American Motor Sales Co., Erie, Pa.

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OILING SYSTEM OF OLDSMOBILE DEFENDER.

(J. T. C., Attleboro, Mass.)

Would you explain the oiling system of the Oldsmobile Defender, model 1912? The system I wish explained has a pressure gauge on the dash, no splash and all bearings have small pipes leading to them. What produces the pressure that forces the oil through the leads? I do not see any pump.

This system has a plunger pump that is driven by a cam on the camshaft, that is operated much the same as a valve tappet. The pump plunger is lifted by a spring and is forced down by the cam as it revolves. The pump is located on the left side of the engine case at the forward end, and if you will look into the oil filler you will note a screw slightly below the top. This screw adjusts the pumpage, as seating it increases the volume of oil forced by the pump each revolution and unseating it (backing out the screw) reduces the volume. Wide variance can be made in the volume of oil pumped by turning the adjusting screw. The pump itself is attached to the lower section of the engine crank case, and is removed when the lower section is taken off.

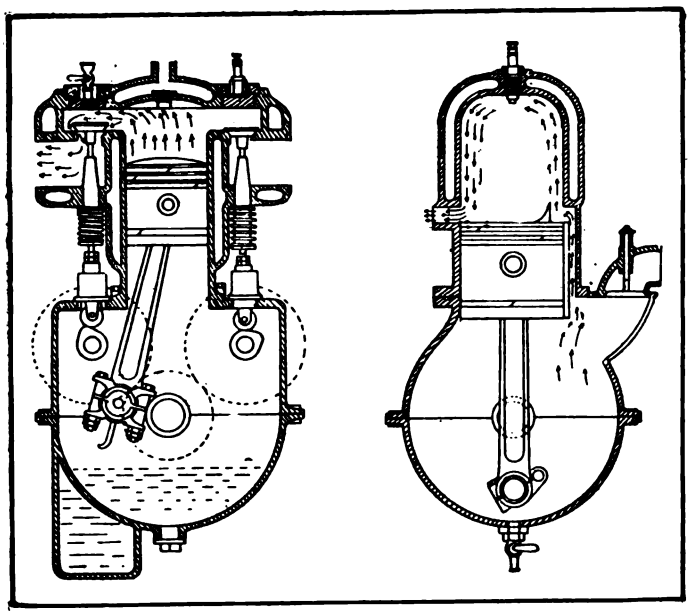
From the pump, of course, the oil is forced through the different leads and through the system to the different main points of lubrication. Considerable oil is thrown off and distributed about the interior of the engine by the centrifugal force of the revolving crankshaft.

TWO-CYCLE ENGINE IN MOTOR CARS.

(A. B. M., New London, Conn.)

I have often wondered why the manufacturers of cars do not use two-cycle engines more generally. I do not see why they cannot be used. Probably you can explain.

Two-cycle engines are ideal for some purposes, but for use in a motor car they cannot be compared to the four-cycle engine for efficient operation. To secure the greatest measure of power and smooth operation from either type, it is neces-



At Left, Through Section of Four-Cycle Engine; at Right, a Two-Cycle Engine.

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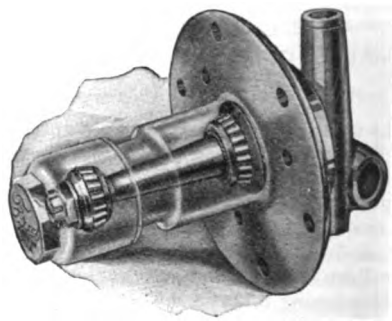
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sary that the operations of admitting a fuel mixture of proper proportions to the cylinders, compressing it by the piston and then igniting it should take place at exactly the predetermined time. It is also essential that before the next fresh charge of fuel is admitted the burned gases of the preceding charge should be ejected and the combustion chamber be comparatively clean of them. In the two-cycle engine these operations must take place in half the time that they do in the four-cycle type when both are operating at the same speeds.

Probably the chief objection to the use of the two-cycle engine in motor cars lies in the fact that it has no adequate means of exhausting the burned gases at rapid speeds. The exhaust stroke, which is lacking in the two-cycle design, is one of the important features of the four-cycle type, as it forces out the old charge and leaves a clear chamber for the new gas to enter.

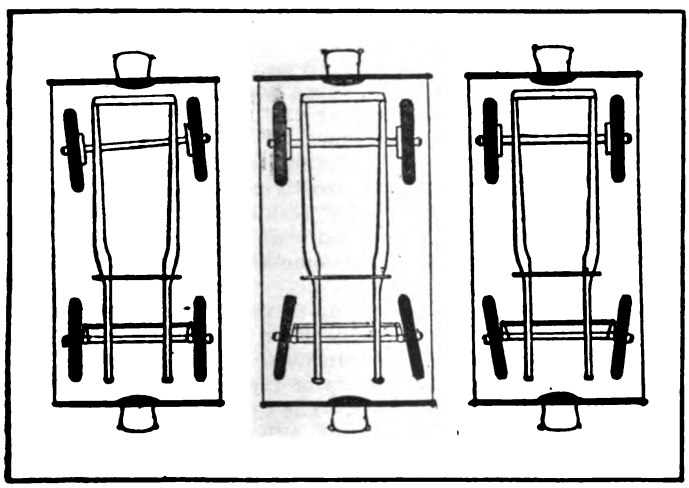
Because the two-cycle engine develops a tendency to choke because it cannot fully expel the burned charge, it cannot attain the high speeds possible with the four. This is clearly demonstrated in the accompanying sketch, showing both types of motors and how they operate. The two-cycle type is shown with the piston at the end of the power stroke, the exhaust and the intake ports being open. It will be seen that the burned gases must be exhausted simply by its own pressure, excepting for a slight assistance from the incoming mixture. The four-cycle engine is shown with the piston going up on the exhaust stroke, thereby affording a positive pumping effect by which the burned gas is ejected.

If this were the only objection to the two-cycle design it might be overcome satisfactorily by enlarging the ports. However, it is imperative that there be no mixing of the fresh gas with the burned and that too much pressure must not be exerted in expelling the old; if they did mix an appreciable amount of good gas would pass out of the cylinder before being used for power. Further, it is essential that the burned gas shall have lost a greater part of its heat before the new charge enters, inasmuch as it would be liable to cause preignition.

TESTING ALIGNMENT OF WHEELS.

(W. S. W., Philadelphia, Penn.)

I recall that some time ago, probably more than a year, you published in your magazine a suggestion for determining the alignment of wheels by using two strips of wood and some string. I can't find the copy in which this appeared and would appreciate your printing it again.

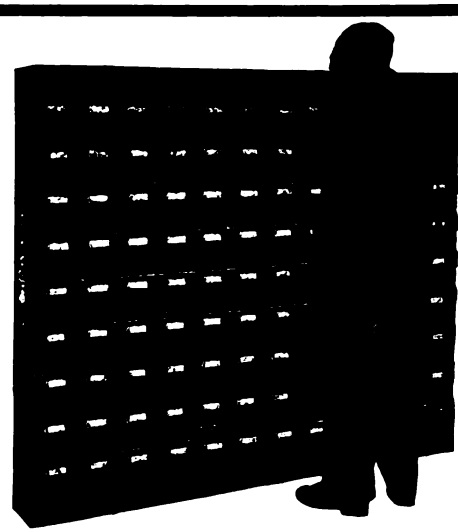


The Rope and Stick Method of Testing Alignment of Wheels.

The device and method to which you no doubt refer is illustrated by accompanying sketch and the following explanation. It consists of two pieces of wood each measuring about seven or eight feet in length and two pieces of heavy cord, each about 15 feet long. In each end of each strip of wood a hole should be drilled, the holes being exactly equidistant from the exact center of the length of the strips. Place the strips of wood on rests at the front and rear of the wheels, as shown in sketch, and join by passing the cords through the holes. The whole assembly should be adjusted so that

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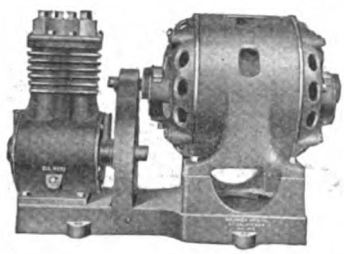
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one of the cords is exactly parallel with one of the rear wheels.

To determine this the distance between the string and the rim of the wheel should be measured—do not measure to the tire, for it varies at different points. If the other rear wheel should not be parallel with the other cord, it is probable that the rear axle is bent, the wheel is out of true or the axle may have been shifted along the spring. In the case of chain driven trucks, it is possible that the tension of the chains may have become unequal and one radius rod is longer than the other.

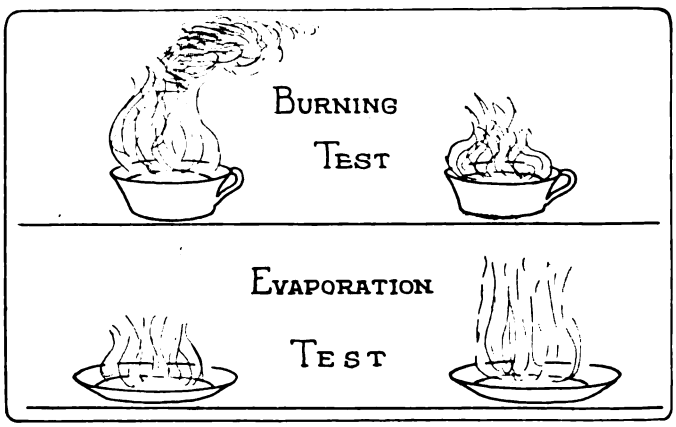
To test the front wheels they should be set parallel with the cord, which should be in alignment with the rear wheels. As wheel rims may vary at different points, it is advisable to give each wheel a quarter turn and then repeat the measurement. The method is illustrated in the sketch.

PRACTICAL TESTS FOR GASOLINE.

(W. W. L., Middletown, Conn.)

I have heard so much about poor quality gasoline and oil now being sold by car dealers, etc., that I am curious about how to test them. Will you advise the simplest and best ways I can do it, remembering that I have no special apparatus of any kind for the purpose.

Most of the reputable oil companies will disclose the laboratory test figures of their lubricants if the buyer insists on having them, and, in the case of the standard brands, the figures are dependable. The figures given usually are the following: Gravity, flash point, fire test and viscosity. The



Two Ways of Testing Gasoline to Determine Quality.

companies have other test figures, some of which are of interest to the user. Viscosity at 212°, cold test, per cent. of acid, per cent. of coke residium.

In comparing various oils the figures which should receive most consideration are the viscosity at 212°, the gravity and the amount of carbon, or "coke" residue. Some of the cheaper oils show fairly good viscosity at ordinary temperatures, but, when subjected to heat, become almost useless as a lubricant.

Gravity, while it has nothing to do with lubricating qualities, is an index of the purity of an oil, as well as of its origin, the oils from the eastern fields having a paraffin base, being lighter than the products of the southern and western fields, having asphaltum base. The "coke" test is also an indication of the purity of an oil, although it does not necessarily indicate the tendency of the oil to leave deposits in an engine.

To roughly determine the relative merits of several kinds of oil, the following procedure is suggested:

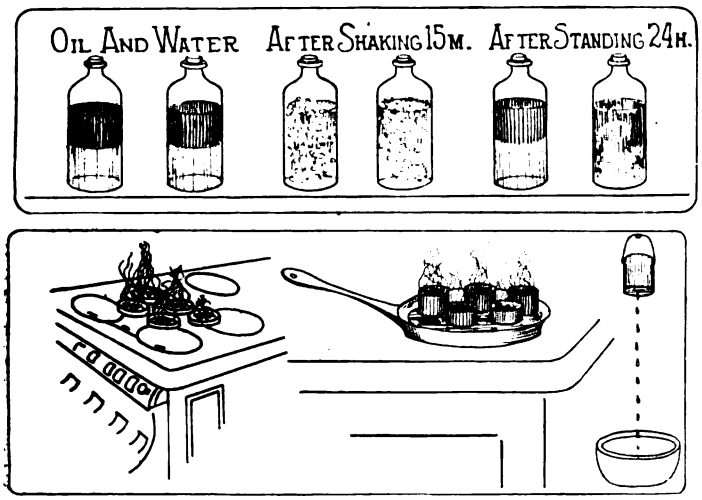
Procure as many covers of baking powder or coffee cans as there are samples to be compared. Put about two tablespoonfuls of each oil in each of these lids and place them on a hot stove. If the receptacles containing the samples are numbered for identification, the small tins may also be conveniently numbered by placing in them short pieces of wire, shot or small pebbles to the number equal to that of the respective samples. The lids should be placed closely adjacent, to insure uniform heating. As soon as one of the heated samples begins to give off smoky vapor it should be removed and

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placed to one side, and so on with the next, placing them in consecutive arrangement. The one standing the longest heat will have the highest flash test, the relative values of the others being in the inverse order of their removal from the stove.

Partly fill a number of small tins of the same kind and size with the different samples. Place these in a saucepan large enough to accommodate them and partly fill with hot water, the level of which should be somewhat below the tops of the tins, which should be covered. Place on the stove and bring the water to a boil. Allow it to boil for some time (the saucepan may be covered) as oil absorbs heat slowly. Prepare another tin by drilling or punching a small hole through its bottom, say about 1/16" or 3/32" in diameter. After the oil in the tins has become heated to the boiling point of the water, empty the contents of one of the tins in the improvised "viscosimeter" and carefully note the time taken for the oil to pass through the small hole. The other samples should be kept on the stove in the meantime, and tested in turn, the elapsed time of each percolation being jotted down for later comparison. It is essential that the quantity of each sample be exactly the same, and that the top of the perforated can be uncovered. The sample requiring the most time to pass through is the best.

A hydrometer is the most convenient means of making this test. If a regular oil hydrometer is not available a gasoline hydrometer may be used, these being quite common. The sample in which the instrument floats the lowest is the lightest and the best.



At Top, Method of Testing Oils for Presence of Acids; at Bottom, Testing for Flash Point and Viscosity.

Place equal parts of oil and clean water in a bottle, having a bottle for each sample and filling them approximately half full. Each bottle should be given a vigorous shaking for 15 or 20 minutes and then allowed to stand for 24 hours. Oils free from acid will entirely separate from the water, which will be clean, while those containing acid will remain partly emulsified and present a cloudy appearance. Instead of shaking the mixtures of oil and water may be agitated with an egg beater, and then placed in the bottles or in glasses.

It will often be found that no one sample shows superiority in all tests, but it is safe to assume that the one which stands nearest to the top of the list, in the several tests, will give the best results.

In testing two or more samples of gasoline probably the simplest method would be to place a given quantity of each in a shallow plate, and place these in the sun, or where a draught of air will assist evaporation. The plates should be of the same size and shape, and should be placed out of doors and safely distant from any exposed flame. An idea of the comparative volatility of the samples can be obtained in this way.

A somewhat similar test, occupying less time, may be made by placing equal quantities in cups of the same size and igniting the samples. The one burning out most quickly, giving off the least black smoke and leaving the least deposit in the cup, is the best. In observing the residue it should be noted that a precipitation of dry soot in the cup is less objectionable than a deposit of a soft, gummy nature.



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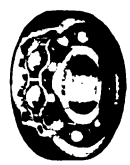
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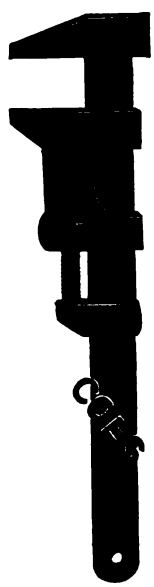


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CONNECTING MITCHELL AMMETER.

(J. P. C., Attleboro, Mass.)

How can I connect an ammeter in the electrical system of my 1915 Mitchell light six so that both the charge and discharge rate of the battery will be shown? Is the light colored wire from the dynamo the charging wire?

The diagram on this page will show how the various wiring connections are made. Of the three wires from the motor generator, those marked M and D + are used in starting, when the unit functions as a motor, and D + and D are used for charging, when the unit becomes a dynamo. It will thus

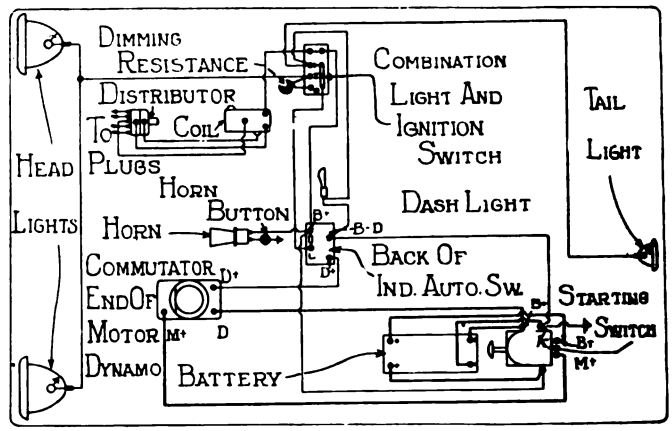


Diagram of Electrical System of a 1915 Mitchell Light Six.

be seen that the wire connecting D + to the right hand front terminal of the starting switch (under floor boards) is the part of the circuit in which the ammeter should be connected.

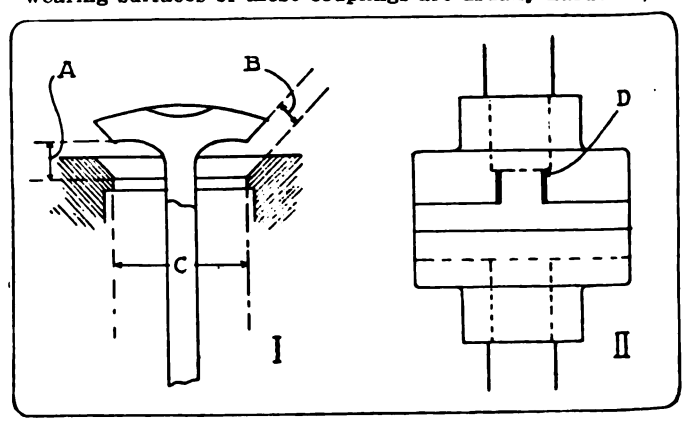
Remove the end of this wire from the starting switch and connect it to one of the meter terminals, after the meter has been attached to dash board. Provide another length of wire, having the same carrying capacity as the other and long enough to reach from the meter to starting switch, connecting this to the second meter terminal and to the same terminal on the switch from which the other wire was removed. If, when starting, the meter reads "charge" instead of "discharge," simply reverse the connections on meter.

WORN OLDHAM COUPLING.

(M. F. C., Boston, Mass.)

After spending a great deal of time trying to locate a very objectionable noise in my motor, and going to some expense to have the bearings taken up, which did not stop it, I finally found that it came from a worn magneto coupling. I enclose a sketch showing how this is made. Please tell me how to take up the wear, which is considerable, as I can rotate the shaft of magneto back and forth quite a lot.

Your sketch, which is reproduced on this page, is a flexible connecting device known as the "Oldham" coupling. The wearing surfaces of these couplings are usually hardened, but



An Oldham Worn Coupling (at Right); at Left, Sketch Illustrates Effective Valve Areas.

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in spite of this, they wear down and permit considerable play after a time, owing to the peculiar action of the magneto armature, which alternately lags behind and runs ahead of the driving shaft. As soon as slight wear permits of angular motion between the two shafts, the impact with which these oscillations are arrested increases rapidly as the wear progresses, so that the trouble, having once started, soon becomes aggravated.

It is practically impossible to take up this wear by the insertion of shims, as these soon work out, owing to the nature of the drive, and the only satisfactory repair is to fit new couplings. When these are installed, care should be taken to get the armature shaft and magneto driving shaft in their same relative position, otherwise, the timing will be changed.

VALVE SIZES.

(A. K. D., New Brighton, N. Y.)

Being interested in aviation and high speed motors, I have closely followed the development of these high duty engines, and am familiar with most of the recent designs. There seems to be a growing tendency to use multiple valves in the cylinder head, and although the object in using two inlet and two exhaust valves undoubtedly has for its object an increase in valve area, I notice that the diameters of some of these valve heads are quite small, being not much more than one-half the size of a single valve ordinarily used in cylinders of similar dimensions.

As the valve area varies with the square of the diameter, nothing is gained when multiple valves of considerably reduced diameter are used. For example, if a two-inch inlet valve is compared to multiple valves having a diameter of one inch, it would be necessary to use more than four of the latter size to effect any gain in area, and, assuming that five were used for the inlets and five for the exhaust, it would require a cylinder head out of all proportions to the bore to accommodate this number of seats.

Just what claims are made for multiple valves? Is the idea to make them lighter, so that, with reduced inertia, they may be made to open and close more quickly?

This inquirer shares a prevalent misunderstanding with regard to effective valve areas. While it is true, of course, that the area of the head of a valve varies as the square of the diameter, it is not the area of the head that determines the size of opening through which the gases must pass. This opening is found by multiplying the circumference of the valve seat by the lift of the valve, or rather, in the case of the bevel seated valve, it is the product of the circumference of the valve head, at its smallest diameter, and the perpendicular distance between the face of head and valve seat, the latter being somewhat less than the vertical lift.

This annular opening is the limiting factor in figuring gas velocities because it is smaller in area than the opening through the valve seat. This would not be true if the valve could be given greater lift. For example, if the perpendicular distance between valve and seat were one-quarter the diameter of the valve, the area of the annular opening would be the same as the opening through the seat. In a two-inch valve the effective opening would have to be one-half inch, but since the ratio of the lift to the effective opening is as 10 to seven (owing to the 45-degree angle of the seat), this would require a lift of about 23/32 inch, which would be impractical.

Since the annular opening around valves varies directly as the diameter (assuming the lift to remain constant), it will be seen that two valves, as compared to a single valve of larger diameter, would provide greater opening so long as their diameters are even slightly larger than that of the single valve. The construction possesses the further advantage of reducing the inertia of the parts, resulting in quicker opening and closing and quieter operation.

Whenever a short circuit in the wiring is suspected it usually can be located by testing the ignition at night time or in a dark place. If there is a short circuit a spark will jump from the wire to the metal with which it is in contact.

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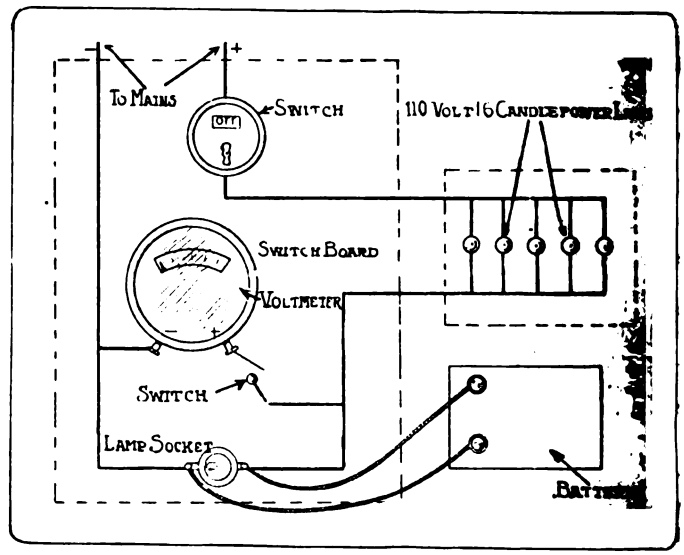
CHARGING STORAGE BATTERIES.

(W. H. K., Bridgeport, Conn.)

Will you please let me know if it would be practical to charge my storage battery from the lighting circuit in my house? The voltage is 110 and I believe it will be necessary to reduce this so the cells will not be overcharged. What would be the best way of doing this?

If it is intended to charge the battery frequently it would pay to rig up a small panel to carry the necessary fittings. The sketch shows a practical arrangement for such a board, with a diagram of the wiring. A small shelf should be provided under the board on which to place the battery.

A bank of 10 110-volt lamps connected in parallel, as shown (only five are shown in sketch) would serve as a rheostat, holding the charging rate down to approximately five amperes. If it is desired to make use of these lamps for illumination it would be better to use 100 volt bulbs, which would burn brightly and only increase amperage slightly. A small



Arrangement of a Practical Home-Made Charging Panel.

board carrying the lamps could then be placed wherever the illumination is wanted, the wiring being extended to it from the main switch board.

It is not essential to use the voltmeter, as this instrument is rather expensive and the condition of the battery can be even better determined by the use of a battery hydrometer, which is comparatively inexpensive. With this instrument it is possible to test the individual cells by testing the electrolite, which should give a reading of 1250 when up to full capacity.

REAL MEANING OF THE CYCLE.

"Cycle" is one of the most misunderstood terms used in connection with automobile mechanics. It will be remembered that the piston must travel through four complete strokes for the deliverance of one power impulse to the crankshaft. This type of engine is used almost exclusively in automobiles and is often referred to as a four-cycle engine. This term is misleading, as the real definition of a cycle refers to a series of operations, hence it would seem that the proper term to apply to this type of power plant is "four-stroke-cycle."

In the majority of cases the motor used in small boats is of the two-stroke cycle type, that is, the piston works through two strokes or one revolution of the crankshaft for the deliverance of a single power impulse to the shaft. It is the practise for automobile writers to refer to an engine as either being of the two or four-cycle type. Do not be confused, however; these are not exactly correct terms, as motors are either of the two-stroke or four-stroke cycle kind.

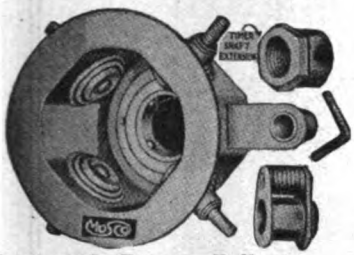
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The Mosco Valve Grinder



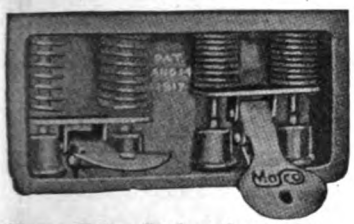
Improved Bemus Ball Contact Timer for Ford Car



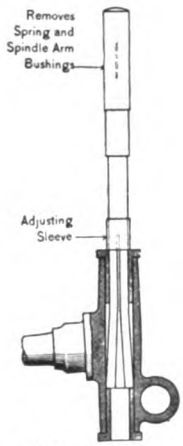
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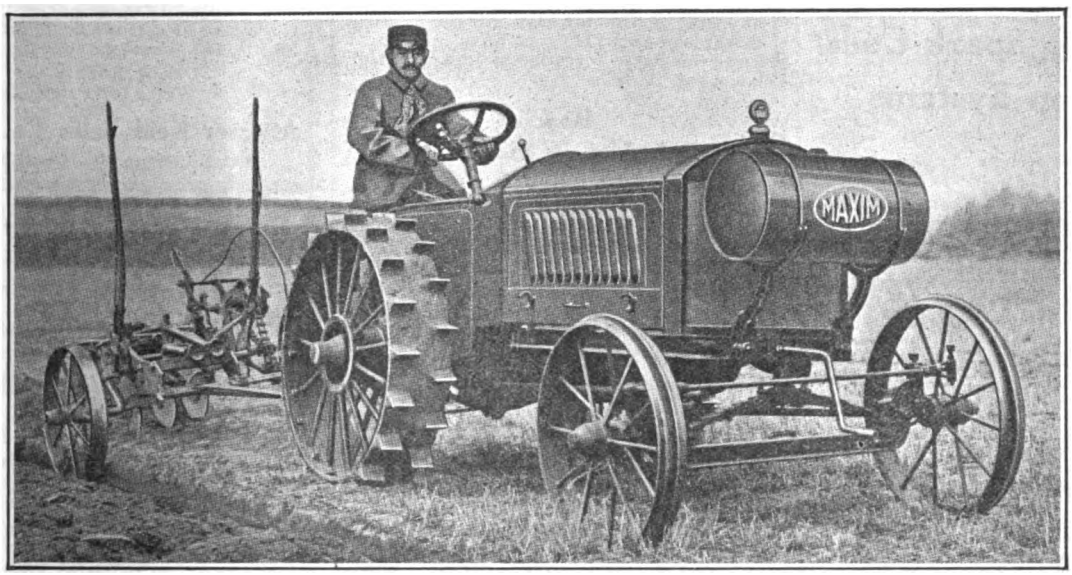
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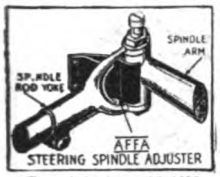
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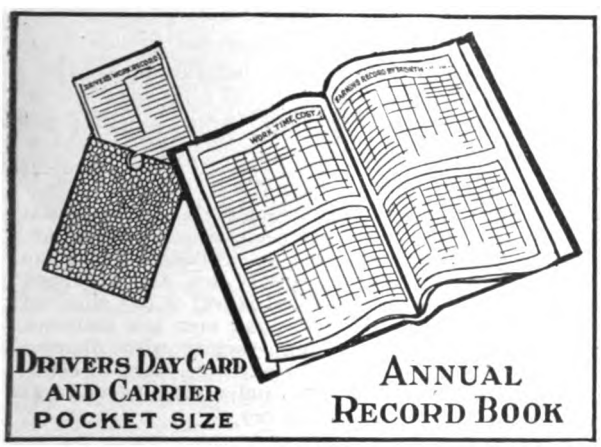
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You have been so close to us through all the years of our struggles toward the light. Your hands outstretched to us have never been empty.

And now we cry to you from the depths of a greater need than even our torn souls have ever known. In the name of pity—do not fail us!

There has been cruel suffering in our lands, massacre, famine, death. But the spirit of our people still lives, and calls to you across the sea to send help lest we perish.

Our God is your God, and we bare our souls for your searching eyes that you may see how we have never denied Him, nor shamed Him. When our world rocked in misery about us, in our torn and tortured bodies our hearts still cradled and sheltered the crucified Christ. We held true in our allegiance to God and humanity.

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Around the world the news has gone, is ringing today clarion-clear that America's men and America's women have never yet been called upon in vain to right a wrong, to protect the weak, to succor the defenseless. We cry to you, help us—America! We are Armenian, Syrian, Greek, Jew, and we speak strange tongues, but our need of you is so great. What is left of our children are starving. What is left of our men and women, young men and maidens, are without work, without shelter, without clothing, racked with disease. Open your great hearts and give, and our people will pay. In years to come, how they will pay in return! You, who are so safe and strong beyond the reach of such misery as ours, open your heart to our cry.

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THE AUTOMOBILE JOURNAL

VOL. LXVI. PAWTUCKET, R. I., JANUARY, 1918. NO. 6.

NEW YORK AND CHICAGO VEHICLE SHOWS SURE SUCCESSES

FOR years the National Automobile Chamber of Commerce has organized both the Chicago and New York automobile shows. The original shows in New York City were promoted by the Automobile Club of America, first as club events, and then this body joined with the Association of Licensed Automobile Manufacturers and the character and proportions of these shows were changed until they became recognized as "national," this largely from the fact that the industry represented by the association was regarded as approving the exhibitions.



Charles M. Brown, President, Automobile Dealers' Association of New York City.

The first New York shows were intended to benefit the treasury of a club, and when the exhibitions were held jointly the profits were shared by the two organizations. Later the association decided that it would organize and promote the New York show because it was profitable, and then the club joined with the so-called "independent" group of manufacturers, which refused to recognize the Selden patent, and for several years the metropolis had two shows.

When the Selden patent was invalidated by adjudication there was a reorganization of the Association of Licensed Automobile Manufacturers, nearly all interests of the industry being eligible for membership, and the National Automobile Chamber of Comemrce was formed. What had taken place in New York City impelled the A. L. A. M. to acquire control of the Chicago show, which had been conducted by an association of dealers, and while there had never been conditions paralleling those existing in New York City, there never was serious opposition to the association taking over the Chicago exhibition and promoting it and making it as profitable as was practically possible.

For years the New York show was organized and operated by a show committee, but in Chicago Samuel A. Miles had managed the event practically from the time that the2 shows were instituted. Then the association placed the New York show under Mr. Miles' direction and since then until this year Mr. Miles has been occupied with the management of both exhibitions.

The National Automobile Chamber of Commerce has always regarded the New York and Chicago shows as "national" in that it, with allied associations, refused to sanction some other exhibitions, those who exhibited at the unsanctioned shows doing so with the prospect of being debarred as exhibitors at the "national" shows, which were believed to be the largest and the most productive from the viewpoint of the exhibitor.

There can be no denial of the fact that some of the so-called dealers' shows were very large, and that they were profitable to the organizations promoting them. But the National Automobile Chamber of Commerce dominated the power vehicle shows to a much larger degree than would appear on the surface from the fact that the members agreed to be bound by any decision with reference to exhibitions.

Last Truck Shows in 1913.

The National Automobile Chamber of Commerce held its last truck shows in New York and Chicago in 1913. Since that time it has refused to sanction exhibitions of power trucks, although there has been innumerable proposals and not a little agitation in the industry and the trade to promoting such shows. Many reasons have been stated to justify this opposition to truck exhibitions. The association has always held that passenger car shows were essential and that these were deserving of encouragement. At the other hand the exhibition of trucks was not believed to be productive of sufficient results to justify the additional expense or organization and promotion.

Various reasons have been stated as reflecting the attitude of the National Automobile Chamber of Commerce, among these being that truck shows held jointly with passenger car exhibits were overshadowed by the car departments and the return financially was certain to be poor; that holding a truck show at the conclusion of a passenger car show was ill advised from the fact that practically all local interest was lost; that to expect the truck dealers (who in some instances were also passenger car dealers) to take the time that would be required for such a show from their business was unreasonable and expensive; that truck buying was influenced by existing transportation needs and not by any special demonstration that would be practically possible at a show; that there was an unnecessary burden upon the manufacturers and their sales organizations, as well as the expense incidental to representation.



Charles M. Larson, Chairman, Show Committee, Automobile Dealers' Association of New York City.

All or any of these reasons may have had weight in the decision of the Na-

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Samuel A. Miles, Manager of the Show of the Chicago Automobile Trade Association.

tional Automobile Chamber of Commerce six years ago when the number of trucks in use in America was comparatively small. Perhaps the conditions resulting from the European war and the subsequent participation of the United States in the conflict may have all influenced decision. The industrial and commercial uncertainty and the need of readjustment of industry to meet post-war conditions may have been ample foundation of the recommendation for the association that no shows be held during the present year.

Dealers Insisted on Shows.

There can be no criticism of the sincerity of the members of the association who voted on the recommendation, but there could be no greater divergence of opinion that is represented by the action of the sales representatives of these same manufacturers in deciding to organize, promote and finance the exhibitions that the industry desired should be abandoned.

The cessation of hostilities in so short a period before the usual season for exhibitions allowed litle time for preparation and forced extreme activity on the part of the Automobile Dealers' Association of New York and the Chicago Automobile Trades Association. Not only this, conditions had materially changed in New York City, for the Grand Central Palace had been acquired by the Du Pont interests and was converted into an army hospital and was no longer available.

Limited Time Not an Obstacle.

One might assume that this and the fact that a manager of long experience with automobile shows was not obtainable would be discouraging. Not so, however, with the New York association, which first voted not only to have a passenger car exhibition, but to follow this with a show of trucks. Next it appointed a show committee headed by C. H. Larson as chairman, and the secretary of the association, Charles A. Butler, was made manager, he acting under the authority of the show committee. Then the historic Madison Square Garden was engaged, and when the number of applicants for space was found to be so numerous that the Garden would not afford adequate space for the show, the 69th Regiment Armory, but a block distant from the Garden, was secured. The combination of the two buildings will give more exhibition area than has ever been available at any previous exhibition.

Following the custom established when both passenger car and truck shows were held the exhibition will continue for two weeks, the passenger car display being opened the evening of Saturday, Feb. 1, and continuing until the evening of Feb. 8, and the truck show being opened the morning of Feb. 10 and continuing until the evening of Feb. 15, the two covering a period of 15 days.

The original intention was to have the display of passenger vehicles in both buildings, but to have the truck exhibition in Madison Square Garden. The large number of applications for space and the decided interest manifested brought about a change of plan, so that both buildings will be used both weeks, but the displays of accessories, supplies, equipment, etc., for trucks will be shown only at the Garden the second week.

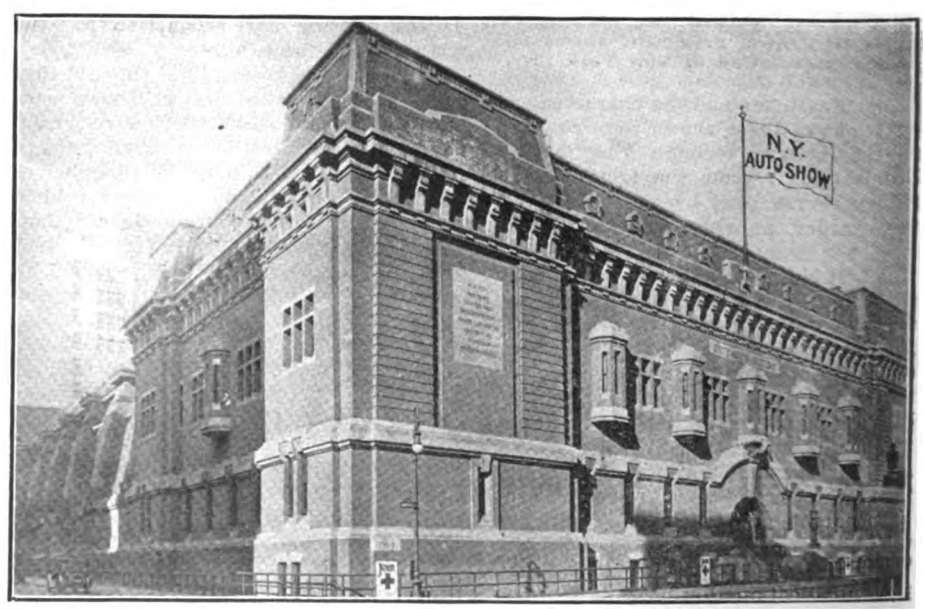
During the first or passenger car show cars and accessories, equipment, supplies, parts, etc., will be exhibited in both buildings, but during the second or truck show vehicles will be shown at the Garden and the Armory, and the accessories only at the Garden. The buildings will be open from 10:30 in the morning until 11 o'clock in the evening. Each ticket sold will entitle the holder to admission to both buildings, there being a coupon attached that will be accepted at either when the original has been surrendered, and the coupon may be used at any time during the show, its use not being restricted to any one day. This is a privilege that was never entertained by the management of previous shows and it is granted with the belief that any person seriously considering buying should have all the time that is desirable for seeing the exhibits, and the show is much too large to be seen in any one day unless done with the intention of viewing only certain displays.

The buildings will be handsomely decorated, the work at the Garden being in charge of M. A. Singer and at the Armory in charge of Joseph St. Petrie. Many changes are necessary in arrangement of the balconies and floors to have the display stands accessible. The decorating will not be spectacular, but it will be in every way pleasing and no doubt satisfactory settings for both cars and trucks. There will be the customary band and orchestral programmes of music during the afternoon and evening of each day.

Show Organized by a Committee.

The committee arranging the show for the Automobile Dealers' Association of New York consists of Charles H. Larson, chairman, Cutting-Larson Co. (Oldsmobile); R. J. Gilmore, Packard Motor Car Co. of New York (Packard); Walter Wood, Van Cortland Vehicle Co. (Peerless); William C. Poertner, Poertner Motor Car Co. (National); Harry J. DeBear, Maxwell Motor Sales Co. (Maxwell). With this committee is associated William M. Sweet of the executive committee of the Motor and Accessory Manufacturers' Association. This committee has been extremely active and energetic and so far as the show from the viewpoint of the public is concerned, there will be nothing lacking because of the extremely limited time for preparation.

Statement should be made that despite the fact that the dealers of New York took over the show there is no antagonism on the part of the National Automobile Chamber of Commerce, which appointed a committee consisting of C. C. Hanch, J. Walter Drake and Samuel A. Miles, to confer with the New York and Chicago dealers' associations, and there has been ample manifestation of cooperation. Besides this the Motor and Accessory Manufacturers' Association formally sanctioned these shows.



The 69th Regiment Armory, New York City, in Which One Division of the Passenger Car and Truck Shows Will Be Housed from Feb. 1 to 15.

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Madison Square Garden, New York City, in Which the Main Division of the Passenger Car and Truck Shows Will Be Located from Feb. 1 to 15, Where the Automobile Shows Were Held for a Number of Years.

Special Features of Show Weeks.

There is reason to expect a very large attendance of those engaged in or identified with the industry, for there will be the winter meeting of the Society of Automotive Engineers held in New York City, Feb. 4-6, with a "Victory" dinner at the Hotel Astor the evening of the final day. There will be a meeting of the eastern members of the National Automobile Dealers' Association, an organization that has upwards of 4500 members, and is becoming more and more important. There will be a dinner given in honor of Capt. E. V. Rickenbacker, who is the leading aerial "ace" of the American army, which will take place at the Waldorf-Astoria the evening of Feb. 3, and which will be jointly participated in by the American Automobile Association, the Society of Automotive Engineers, the National Automobile Chamber of Commerce, the Motor and Accessories Manufacturers' Association, the Automobile Club of America, the Motor Club of New York and various aeronautic clubs. The toastmaster will be Congressman Clifford Ireland, a member of the contest board of the American Automobile Association.

There will be numerous conferences and meetings in addition to the fixtures that have been specified and during the truck show there will be a conference of truck manufacturers which may have important bearing on the future of the industry, so far as this can be determined by any organization. The truck manufacturers' meeting will be under the auspices of the National Automobile Chamber of Commerce.

Exhibits Greatly Varied and Many.

The prospects for the exhibition of trucks is maintained to be exceptional. The original plans for the show have been amended to meet demands for display space, and statement is made that the number of exhibitors will be the largest ever seen together at any one time. There will be trucks of all makes, types and sizes, ranging in capacity from 800 pounds to 15,000 pounds. There will be road tractors all kinds and of various power ratings, which will have semi-trailer and trailer equipment. There will be innumerable standard and special bodies with quick discharging equipment, both manually and power operated, and, of course, bodies designed for general and specific work.

The list of exhibitors of trucks, tractors, conversion units, etc., although not complete, shows a total of 52, which includes a number built by concerns that have recently begun production, among these being the Graham, manufactured by Graham Bros., Evansville, Ind.; the Paige, made by the Paige Motor Car Co., Detroit; the Shaw Taxi, made by the Walden W. Shaw Co., Chicago; the Ward La France, made by the Ward La France Co., Elmira, N. Y.; the Traffic and the Warren trucks. Another machine that has not been seen in the East is the Lapeer tractor, designed for use with semi-trailers and trailers. The Nash "Quad" will be the only four-wheel driven truck exhibited, and the Troy Trailer Co.'s agent will display a series of these units. The Jaxon Steel Products Co., Detroit, will show a truck equipped with Jaxon wheels, which are claimed to be extremely efficient, and there will be one or more Fordson tractors shown. The Holt Manufacturing Co., Peoria, Ill., will also show a gasoline locomotive.

The number of accessory exhibitors shown in the accompanying list is far from complete, and it shows a total of 47, which will probably be at least doubled.

THE CHICAGO EXHIBITION.

The Chicago exhibition will take place at the Coliseum and Annex, and the First Regiment Armory, this following the plan that has been the vogue for years in that city, and it will be under the auspices of the Chicago Automobile Trade Association and the management of Samuel A. Miles. Mr. Miles, having for years managed the Chicago shows, was appealed to by the show committee of the association and he undertook to do in weeks what had previously been accomplished in months with a well trained organization.

Fortunately Mr. Miles was able to gather practically all of his own staff of employees and by resorting to extraordinary means for distributing applications for space and by the cooperation of the Motor and Accessory Manufacturers' Association the returns were obtained very quickly and in sufficient numbers to justify reasonable success. The publicity campaign was very productive and this brought in a large number of applications, so that there is every reason to believe that the Chicago show will be at least as large and quite as interesting and attractive as in former years. There was even no obstacle as regards decorations, for the association was able to take over what had been prepared for the show previous to the action of the National Automobile Chamber of Commerce, and so far as decorations are concerned the show will have what was originally intended for it.

The exhibition is announced to be the 19th annual Chicago show, and it will have all the usual features and the arrangements as to details will be practically unchanged. The passenger car show will have probably close to 80 different makes of machines, the incomplete list showing 69 exhibitors, and with the cars will be a large number of accessory, supply and equipment displays. The in-

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complete total of accessory exhibitors is 107, and there is every reason to believe that this will be increased 50 per cent. and 100 per cent. is by no means improbable.

The passenger car show will be opened Jan. 25 and will be concluded Feb. 1. The truck show will be opened Feb. 3 and end Feb. 6. The trucks will be shown in the Coliseum and the Coliseum Annex, this bringing this division under one roof.

The incomplete list of truck exhibitors shows a total of 43 makes, including the Fordson tractor and the Couple-Gear and Walker electric trucks. The Lapeer road tractor will be exhibited and there will be Nash and F-W-D four-wheel driven trucks. There will be a number of trucks of comparatively recent production, which include the "twin-frame" Panhard, the Graham, Mutual, Paige, Patroit, Tower and Winslow.

The number of accessories exhibitors accredited to the truck show, with many applications pending decision, is 42, and there is reason to expect that this will be increased to approximately 100. One will note that the Chicago truck division will be very much larger than any show previously held in America, and that the Coliseum will not be too large for it.

During the show there will be meetings of the National Automobile Dealers' Association, the Chicago section of the S. A. E. and a meeting of the Motor and Accessory Manufacturers' Association. The National Automobile Dealers' Association will hold its annual meeting Jan. 28-29 and will elect officers. This will probably be the most important gathering of the organization of the year. Partial lists of truck and truck accessory exhibitors are shown on these pages.

FORD PARTS NOW OBTAINABLE AT GARAGES.

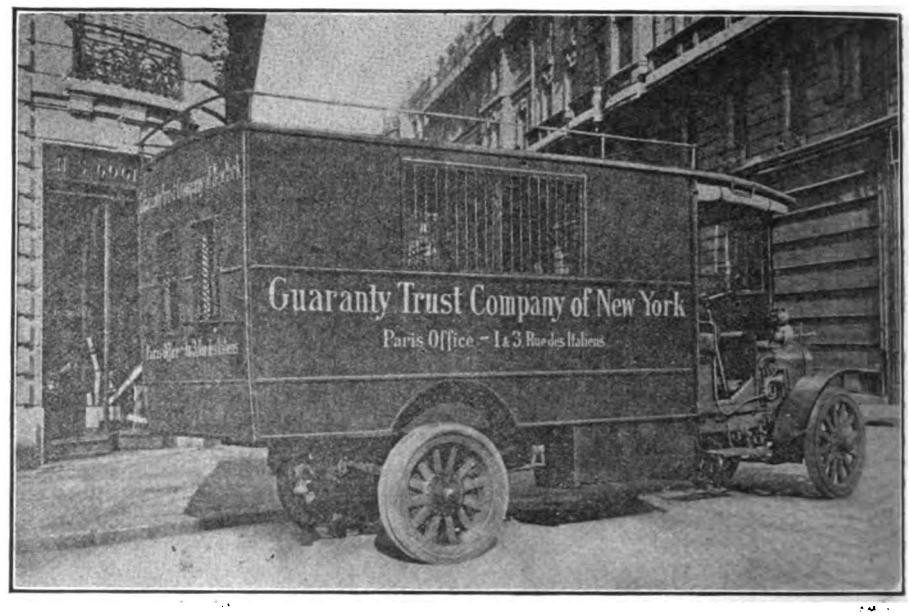
Any garage can now handle Ford parts and secure the regular dealers' discount on same. This arrangement went into effect Jan. 1. The change is expected to not only increase the distribution of the Ford parts, but also in a broad way militate against the many so-called "fake" parts which have been on the market. The Ford Motor Co. had been trying out this method in a limited way and had found it successful.

The Ford policy is gradually being broadened with a view of making the car and its parts almost a matter of general merchandising.

TRUMBULL ADVERTISING MANAGER.

Horace N. Trumbull has been appointed advertising manager of the Wellman-Seaver-Morgan Co., Cleveland, O. He was formerly advertising manager of the S. K. F. Ball Bearing Co., Hartford, Conn. He has been in the Engineer Officers' Training School at Camp Humphreys, Va.

T. B. Fogg has been appointed branch supervisor of the Garford Motor Truck Co., Lima, O., and is head of a new department of supervision.



Selden Truck Chassis with Steel Body Designed to Serve as a Mobile Office of the Paris Branch of the Guaranty Trust Co. of New York City, to Afford Bank Facilities for the American Armies in France.

Motor Truck Branch Bank for Armies in France

One of the necessities developed by the European war is, for the American soldiers at least, banking facilities. There is very nearly 2,000,000 men in all branches of the service now abroad, and they are paid by the government. Obviously cash is needed for payment, and yet the difficulty of handling large amounts is such that payment is usually made by checks, which must be cashed.

During the period of actual hostilities prompt payment was not always possible, because when the checks were in readiness the commands could not be mustered, for they could not be withdrawn from service for even a brief period, and there were many reasons why the men did not receive their money promptly. With the cessation of warfare conditions were entirely changed and the Guaranty Trust Co. of New York City, one of the largest banking institutions of America, decided to establish several mobile branches which could be connected with its Paris branch and could be located wherever desired for periods or regular or occasional intervals, affording to the soldiers practically every bank facility that would be essential to their needs.

These branches will be motor truck chassis equipped with bodies designed especially for the service. The company negotiated with the Compagnie Francaise des Establissements Selden Truck Sales Co., which is the French branch of the Selden company, and after choice of a chassis a body design was determined. The body frame is oak and the panels are sheet steel, and the finish is a light gray. The interior is fitted with office equipment and a small, but very strong safe. The body has two paying windows and an adjustable counter at the rear, these being about the height of a man's shoulder, so that a customer cannot reach into nor see inside of the body. The Selden company has built 10 vehicles of this type for use in foreign countries.

The expectation is that the banks will be used by United States disbursing officers transporting cash to different camps and posts, and they will also afford banking facilities to the soldiers, for they can cash checks or buy drafts or make deposits, can make exchange of money and can have available the business convenience that obtains with the main bank or its branches.

NEW MEN JOIN FIRESTONE STEEL PRODUCTS CO.

The sales organization of the Firestone Steel Products Co., manufacturer of solid and pneumatic tire rims, bases for solid tires and the S. A. E. bands, has been strengthened by the addition of three men prominent in the tire industry.

A. D. Droeger assumes the position of manufacturers' representative, in which capacity his duties will carry him throughout the entire country. Mr. Droeger has been a special representative of the United States government, assigned between Washington and Chicago upon rubber requirements for trucks, aeroplanes, balloons, submarines and other war products.

C. W. Flick will cover eastern territory. He brings to his new connection the advantages of training received as assistant sales manager of the Mason Tire and Rubber Co. He also served for some time as assistant manager of pneumatic tire sales with the B. F. Goodrich Co., Akron.

J. C. Bailey becomes western representative. Having a broad acquaintance with various manufacturing lines, his experience has been derived principally from his activities as city salesman and branch manager in Akron, Buffalo and elsewhere. Mr. Bailey comes from the Mason Tire and Rubber Co.

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SHORT CUTS FOR OWNER-MECHANICS

Suggestions for Adjustment, Repair and Restoration of Machines to Normal Efficiency and Appearance

Steel that has rusted can be cleaned by brushing it with a paste composed of the following ingredients: Half an ounce of cyanide of potassium (poison), half an ounce castile soap and an ounce of whiting, mixed with water to paste consistency. After the paste has been applied the metal should be washed with a solution composed of one part cyanide of potassium and four parts water. At the other hand, rust of steel parts may be prevented by applying with a brush a mixture of one part of caoutchouc and 16 parts of turpentine, this being used as a varnish.

Creaking Wheels.

Constant breaking of wheels, while not ordinarily serious, is often extremely annoying and the simplest manner of stopping the noise is to loosen all of the rim lugs. Then instead of tightening them in rotation around the circumference of each wheel, as would appear the most practical, screw one nut on, but do not tightly seat it. Then screw on the nut diametrically opposite to the same degree. Now screw on the other nuts, alternating as with the first two, and when all have been put on to the same degree they should be tightened gradually, with similar alternation. If this does not tighten the wheels satisfactorily, oversize wedges or shims can be fitted.

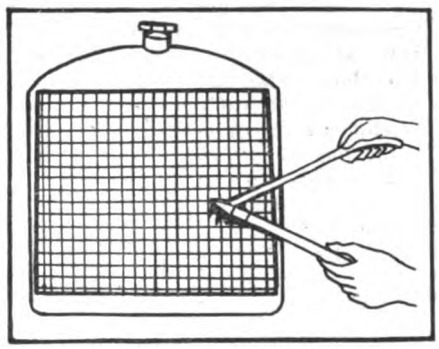
Fan Belt Care.

If the fan belt is driven by a V shape pulley it had best be removed occasionally when cleaning the machine. The belt should be cleaned thoroughly with a stiff brush and then wiped with a cloth saturated with neat's foot or castor oil. This care will preserve the leather, soften the belt and cause more quiet operation. The fan itself will probably require no attention aside from oiling the shaft bearings. Sometimes the belt will stretch or become loose, so that the speed of the fan is reduced by slippage, which may cause overheating the engine because the velocity of the air circulating through the radiator may be greatly decreased. If the belt becomes slack, loosen the nut that retains the eccentric arm on which the fan is mounted, raise the arm so that the belt tension is increased, and then tighten the nut. Sometimes this retaining nut is left threaded, instead of right, and too great strain on the eccentric arm while tightening may cause the arm to crack.

Leaky Radiators.

Leaks in radiators are often difficult to reach and still more difficult to repair. They can generally be detected by steam arising from water that flows from them and down through or outside of the cooling section. The greater tendency of the cooling water to boil after the radiator has been refilled is another indication, although common to all leaks in the system, that may lead to discovery of the defect. Scouring the circulation system with a strong alkali, such as soda, will sometimes seal small leaks, and this might also be effective for slight cracks in water jackets, as the soda, when in contact with the iron, will form an insoluable filling that will be better than a "rust" repair.

The standard honeycomb radiator may develop a leak at any time. The metal is so thin and the joints so numerous that



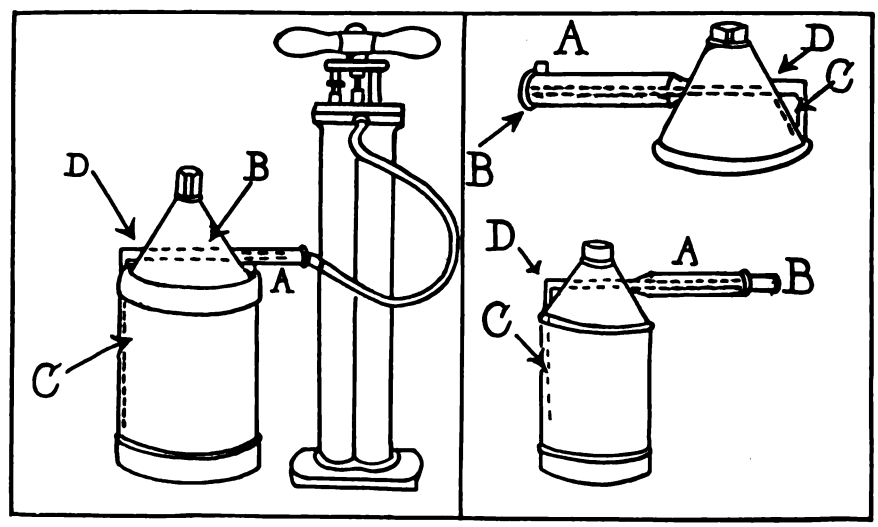
Soldering the Leaks Requires Care and Usually Should Not Be Undertaken Save in Event of Emergency.

uniform structural strength is not always certain, and should a cooling section leak a repair is not always immediately possible. In such an event recourse may be had to a small accessory known as a leak preventer, which consists of two small plates or washers, one face of each plate being covered with a piece of thin sheet rubber cemented on. In the centers of the rubber covered sides of the plates are eyes or hooks. These are used with small spiral springs. In using this device the spring is run through a cell where there is a known leak and the plates are hooked on to the spring ends, the tension of the spring will draw the rubber covered plates closely in contact with the ends of the cells and leakage will be practically stopped. These devices can be obtained at most supply stores, and if a car has a honeycomb radiator several of the preventers can be carried in the tool box.

The construction of the honeycomb radiator is such that a temporary repair is practical, but leaks of other types that develop while on the road cannot be checked as easily. Soldering leaks is by no means easy, for there is such a wide area of sheet metal that the solder, which must be thinly applied, cools as it touches it and cannot be manipulated. To find a leak, remove the radiator from the chassis and after plugging all the openings but one, rub the tube of a tire pump through a large cork and place the cork in the last opening. Place the radiator in a tub or tank of water and pump air into it. Bubbles will appear, for air will be forced through the leak or leaks. These should be marked so they can be found when the radiator is removed from the water. The leaks can then be repaired by soldering. One of the fundamentals of such repairing is to have the metal of the cooling section scrupulously clean before the flux is applied. Unless this care is observed the solder will not adhere.

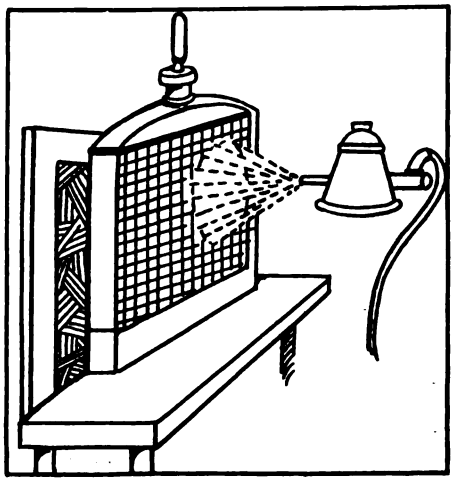
Painting Radiators.

Painting a radiator with an ordinary painter's brush is difficult work and cannot be done quickly. Where painting is regularly done the quicker and more certain way is to dip the radiator into a tank of paint, and after it has drained it is coated evenly and the appearance is uniform. But where the work is occasional a very satisfactory job can be done with a spraying outfit. A simple and yet practical device can be made by almost all motorists. It consists essentially of the elements shown in the accompanying sketches, in which are two sizes and designs. These are a can to contain the paint having a hollow cylindrical handle (A) extending at a right angle to the side through which passes a smaller tube (B) that extends to the other side of the can and above the main body section, with a second part or section (C) placed verti-



Home-Made Paint Spraying Outfits: At Left, for Use with a Tire Pump; at Right, for Use with Compressed Air; A, Handle for the Container; B, Horizontal Tube of Syphon; C, Vertical Tube of Syphon; D, Outlet for Spray of Paint.

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Spraying the Paint on a Radiator, Which Should Be Tilted Forward Slightly so the Paint May Drain from the Cells.

cally, with the lower end close to the bottom of the can and the upper end at the extremity of the horizontal tube (B). The tubes (B) and (C) are indicated by dotted lines.

This is in effect a simple adaption of a syphon principle, such as is found in atomizers, and when air is forced through the tube (B) in the handle directly across the upper end of the vertical tube (C), the liquid inside the cam is drawn upward through the vertical tube and sprayed over a considerable area directly in front of the tube (B). In using such an apparatus the paint may be a mixture of lamp black and turpentine or a mixture that contains a good percentage of turpentine. When painting the radiator this should be sufficiently off a vertical position so that the excess paint may drain from it.

Still another home-made paint spraying apparatus may be made by combining an oil can (kerosene) and a tire pump. The can should be a half gallon in capacity. The arrangement of the handle may be horizontal or otherwise as desired, but the syphon should be of two small brass pipes fixed at a right angle, one extending horizontally through the top of the can, to afford stability, and the other vertically through the top of the can nearly to the bottom. If the handle is horizontal one of the tubes may be carried through it. The end of the horizontal tube outside of the can should have a coupling for attaching the tire pump, and the cap of the filling opening should have a gasket so that the can may be made air tight to obtain sufficient vacuum to syphon the paint.

Hot Water Heater for Car.

What is claimed to be a practical car heater is operated with a circulation of water taken from the engine water jacket, the pipe being coupled to the jacket wall of the last or No. 4 cylinder, and returned to the base of the radiator. The conception may be made at the drain cock or through the outlet manifold. Portions of the floor are cut away so that the heater may be flush with the floor. The radiator heater is made of regular water piping and the housing of cast iron or galvanized iron. The top plate is galvanized iron with a number of holes through it. This system can be used only where there is a circulation pump. The box to hold the heating pipes can be cast at a foundry for a reasonable price. The galvanized iron can be obtained from any plumbing supply house, all cut to fit, and all necessary riveting and joining can be dont by such a concern.

Another method of heating is to utilize the heat of the exhaust gasses instead of water from the circulating system. With this plan the pipes are connected with the exhaust pipe instead of the engine and radiator. Only one side, the inlet, would be connected, but there must be an outlet for the escape of the gas after it has passed through the heater.

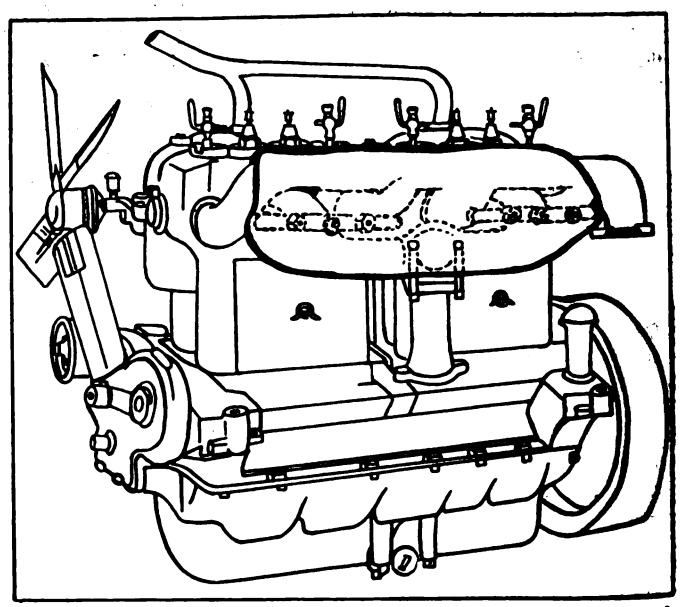
Greater Fuel Efficiency.

The greatest practical fuel-economy is always desirable, and probably much better results are generally obtainable than are realized by the majority of owners, but those who are willing to fit their machines with equipment that they can make themselves can keep down the expense and further economize. Many cars that are decidedly serviceable are not equipped with means of heating the fuel so that it will the better gassify and be a more combustible mixture. With low grade gasoline one obtains comparatively small mileage, the carbon deposits are heavy, and there is the danger of damage from inadequate lubrication through dilution of oil in the crank case and reservoir from fuel that has entered the cylinders and drains past the piston rings and pistons.

Many machines built within two or three years are equipped with the so-called hot-spot or hot pin manifolds, but thousands of cars have not such fitting and cannot obtain the fullest fuel economy. The owners can obtain, however, combined exhaust and intake manifold castings that are claimed to be very economical. For comparatively small expense one can adapt an engine so that the fuel can be more efficiently utilized, provided the intake and exhaust manifolds are on one side.

The owner must obtain a package of steel wool, sold at any hardware or painters' supply stores, and a quantity of asbestos ribbon, such as is used for wrapping furnace pipe. The wool should be packed solidly between the two manifolds, using two packages if necessary, and after this wrap both with the asbestos ribbon. When this is done both the manifolds and the steel wool will be practically one unit. Since the steel wool serves as a conductor of heat from the exhaust manifold to the intake, the purpose of the asbestos covering is to confine or concentrate the heat and prevent it being diffused by the draft of air from the fan, and of course it keeps the steel wool together.

Where the carburetor is not fitted with a hot air stove it is highly important that one should be installed. The flexible hose or tubing can be obtained from any supply store and the heater is sheet iron. When attaching the heater should be formed so that it partly encircles the muffler type of exhaust manifold, care being taken to have the air inlet pointing towards the front of the car. This construction is desirable for the reason that the volume of air forced in increases with the vehicle speed. As a result the mixture is slightly weakened, which under normal conditions, is highly desirable, as well as beneficial, from the viewpoint of efficiency.



Old Engine with Exhaust and Fuel Intake Manifolds Wrapped with Steel Wool and Asbestos Ribbon to Retain Heat and Better Gassify the Mixture; the Manifolds Shown by the Dotted Lines.

Lamp Repairs.

This is a practical method of repairing a bent head lamp rim, if it is made of nickeled metal. Remove the rim from the undamaged headlight and pour molten babbitt metal into the hollow part of it. This will not damage the nickel finish of the rim. When the metal has cooled it can be removed and placed in the best rim. With a light hammer and gentle blow the bent metal can be conformed to the shape of the cast babbitt. A soft cloth should be placed under the nickeled rim so that its finish will not be scratched by the restoration process.

Making Grease Cups Secure.

The grease cups on universal joints and on similar mechanisms have a tendency to work loose under the influence of centrifugal movement of the shafts. When cups so used have been found to loosen frequently they can be made perfectly secure, after being screwed in tight, by setting them with a center punch.

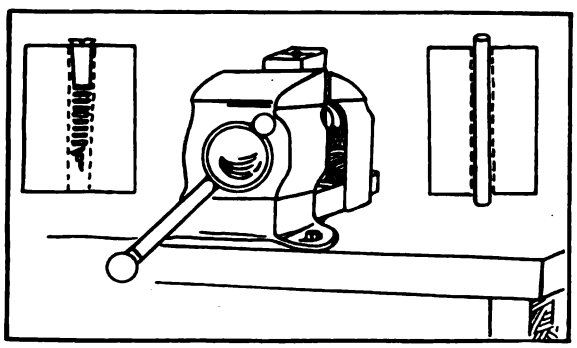
Use the Slip Cover.

The top slip cover—the covering placed on the top when it is folded—should always be placed over the folds of the top. This protection will greatly lengthen the

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life of the top, the general appearance will be continued for a much longer period and the comfort of the passengers will be considerably increased. If the cover is not used the top will soon fill with dust, due to the reduction of the air pressure at the rear of the car while being driven, and when the top is raised the dust will be spread over the passengers, soiling their clothing and wraps and causing annoyance and discomfort.

Too few car owners are particular to give the care that should be exercised when folding the tops. The folds of the fabric should be removed from between the bows, so that they cannot chafe and be damaged or even destroyed. All folds must be free from the bows. This care will add to the life of the top and will keep it in better condition. Mohair tops should be frequently cleaned by brushing thoroughly with whisk brooms, and spots can be eradicated by sponging with warm water and castile soap. Dull or scratched curtain windows can be made clear by saturating a cloth with equal parts of ether and alcohol, which removes a small volume of the celluloid.



Flanging Copper Tube with Wood Block Drilled for Size of Tubing and Divided at Center of Bore; at Right, Tube in the Fixture; at Left, Flat Headed Machine Screw Dropped Into Tube in Readiness for Making the Flange with Light Hammer Blows.

Too often the top is neglected and becomes shabby in a few months time, while if reasonable care were given it would have quite as good appearance as the body and running gear of the car, and there would be no reason for dissatisfaction so far as appearance is concerned. The top should never be folded when wet, for there is a possibility of mold or mildew, which will cause the fabric to deteriorate. If the car is to be laid up for a winter the top should be left up, as this will keep it in shape, and the upholstery should be cleaned and covered with large sheets of cheese cloth, and protected from dust and moisture by attaching the side curtains.

Simple Test of Engine Fuel.

While most motorists know they can obtain only a low grade of gasoline, they are utterly at loss to determine its quality, at least so far as volatilization is concerned. This information may serve a very useful purpose, especially while touring. The following simple test can be made practically at any time and will be a guide sufficiently accurate to insure obtaining a fair quality of fuel. Procure a piece of ordinary writing paper that is clean and white and place a few drops of the gasoline on it. Note how long a time is required for the fluid to evaporate. If when dry the paper is greasy or there is discoloration, the oil may be known to contain a sufficient volume of non-volatile impurities to considerably reduce its efficiency when used as an engine fuel.

Restoration of Worn Pedals.

The constant use of the clutch and service brake pedals, which are operated with the feet, often wears the foot pads of the pedals so smooth that one's shoe soles may slip, so that there is uncertainty of control of the two most important members with which the car is driven. There are times when safety of vehicle and passengers is dependent upon the certainty of control, and were one's foot to slip accident and perhaps disaster might eventuate. Motorists who understand the meaning of "Safety First" can easily restore the surfaces of the pads by removing them from the car, and placing them in a vise and roughening the surfaces with series of punches. The faces of the pads are first coated with chalk and series of lines are drawn diagonally across the pads with a pointed tool. Marks are made at the intersection of each line with a diamond-nosed chisel and a hammer, so that the pads are thoroughly roughened and slipping of the feet on them is well nigh improbable.

Many repairers of automobiles find it necessary to flange copper tube to make connections with carburetors, vacuum feed systems and the like. An up-to-date shop may possess up-to-date equipment or tools designed for flaring or cupping copper tube, but those not having such facilities may do this work with a simple fixture that can be made by any worker with tools ordinarily available.

A block of hard wood, two inches square and four inches long, is bored longitudinally in the center with a 5/16 inch drill, and then is divided centrally along the line of the bored hole with a fine saw. This serves as the clamp for holding the tube in the jaws of a vise, the tube being placed in the bore of the block, with one end projecting an eighth inch at the top. Then an ordinary flat-headed machine screw, with a body diameter that will fit loosely in the tube, is dropped into it. The screw is then tapped lightly with a hammer. At every blow the screw will turn slightly. After a certain number of taps the tube will be flared or cupped accurately. If the tube is found to be hard it may be annealed by heating it red hot and then plunging it into cold water. A clamp can be made in this manner for any diameter tube, and a clamp will serve for years if given ordinary care.

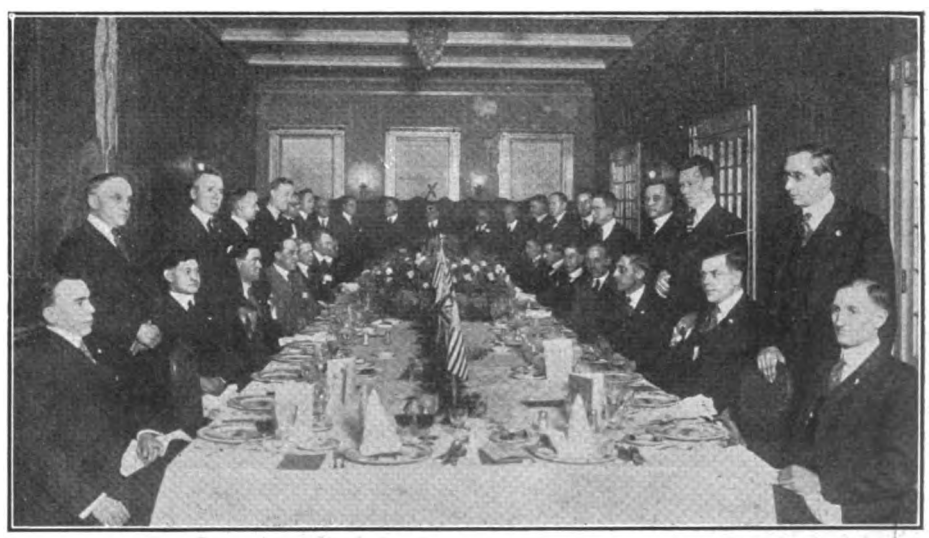
BOULDEN ENTERTAINED SELDEN SALES ORGANIZATION.

H. T. Boulden, vice president, in charge of sales and advertising of the Selden Truck Sales Co., Rochester, N. Y., gave a complimentary dinner to the department heads and traveling representatives of the Selden organization, present at a sales conference at the Selden factory, at the Rochester club, in accordance with his annual custom. The affair was thoroughly delightful. It was announced that the Selden organization had enjoyed a most prosperous year and was preparing for even bigger things this year.

Mr. Boulden was toastmaster. The principal speakers were: George C. Gordon, president of the Selden Truck Sales Co.; Robert H. Salmons, vice president of the same organization; C. H. Blackman, general manager "Commercial Vehicle" of New York; R. H. Tolley of the Timken Co., Akron, O.; C. H. Parsons of the Brown-Lipe-Chapin Co., Syracuse, and A. R. Kroh, Chicago, Ill.

CAMERON TO SELL GOODYEARS IN AUSTRALASIA.

A. G. Cameron, St. Louis, manager of the Goodyear Tire and Rubber Co., has been given charge of the Australasia trade, and he will spend several months each year in the South Seas.



Vice President H. T. Boulden of the Selden Truck Sales Co. and His Guests at a Dinner Given by Him to Department Heads and Traveling Representatives at the Rochester Club, Rochester, N. Y.

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ACCESSORY SPECIALIZING DEVELOPED AN INDUSTRY

Remarkable Growth of Motor Specialties Co., from 10-Man Shop and One Salesman to Ideal Plant and Sales Organization Doing World-Wide Business

DEVELOPED from a very small shop that was engaged in producing an instrument utilized by the automotive industry the Motor Specialties Co., at Clematis Brook station, in the city of Waltham, Mass., is an example of the growth of an industry through specialization. The original operations were begun in 1908 at 10 Pelham street, Boston, where a single room was rented and about 10 men workers produced Bemus timers. The inventor of this timer was the entire sales force and sought business from a small number of specialty and accessory dealers and from various manufacturers of automobile vehicles.

Today the company has an admirable property, on which very large expansion is possible, the buildings are constructed with regard to obtaining high efficiency from equipment and employees, the facilities are the best obtainable for economic production, and upwards of 150 men and women are employed.

During the 10 years that has elapsed the business of the company has developed wonderfully, for its products are sold the world over and have become recognized as standards in the automotive industries of all countries. The company has a distributing organization in this country and abroad that has constantly increased the volume of sales in extremely keen competition, and its selling resources have been so perfected that it has direct representation in all parts of the United States and Canada, with exceptionally energetic connections in foreign commercial centres.

The original concern was the Monitor Manufacturing Co., which begun to make Bemus timers, which is probably the best known of any accessory for gasoline engines, and it is now quite as much of a standard product as can be specified. The company also produced the Monitor distributor, another necessary accessory when the source of ignition current was primary or secondary batteries.

There was then no recognized center of the automobile industry. The development of power vehicles was highly transitory and changes were made with each successive size, type or model built, the object seemingly being to have what might be regarded as "new" by motoring enthusiasts rather than standardized equipment that was continued because of its undoubted quality or value mechanically.

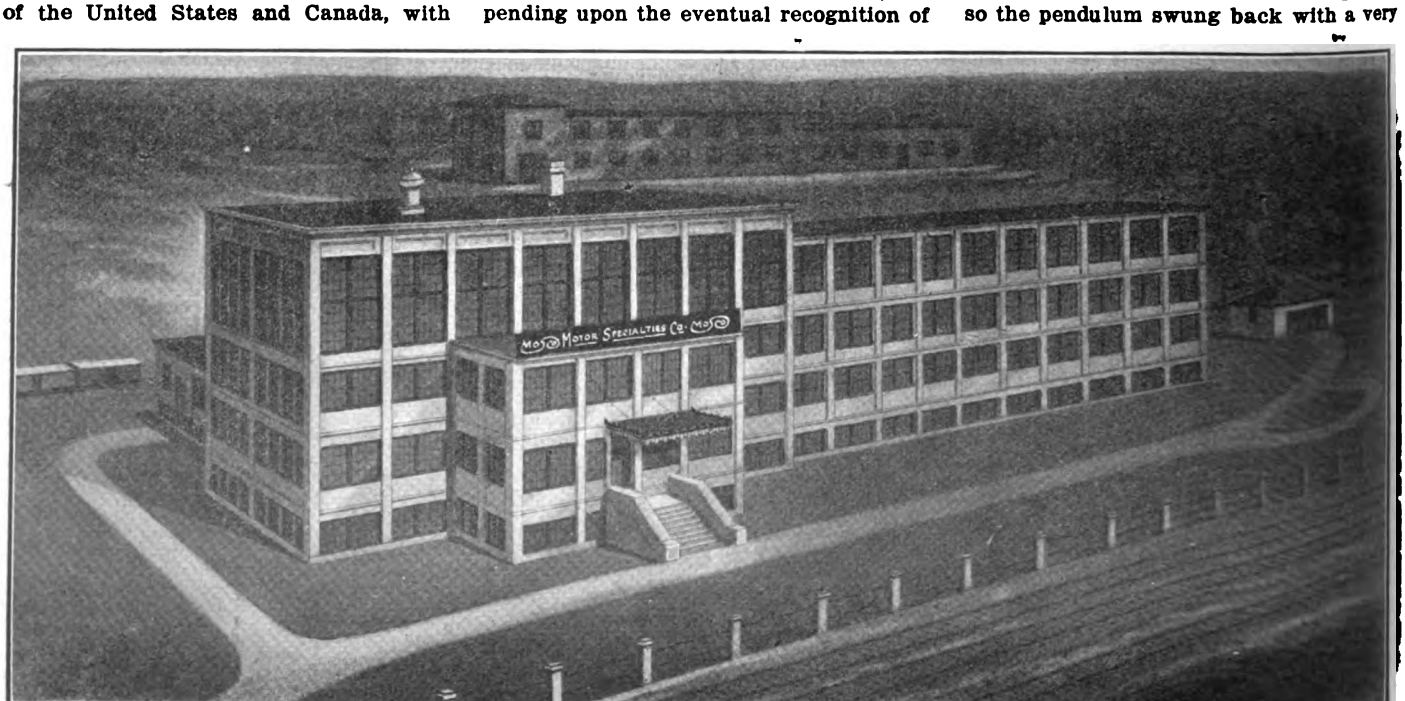
Bemus Timer a Quality Product.

The Bemus timer was invented by a man who had mechanical genius and considerable business ability. Time has proven that he had not only thorough electrical and mechanical knowledge of internal explosion ignition, but the timer was designed and constructed to have practically every desired quality. He realized the commercial possibilities as well, and rather than dispose of his patents he preferred to have the timers made to contract as he sold them, depending upon the eventual recognition of the timer by engine and power vehicle manufacturers and its use in large numbers, believing that it would be extremely productive from a financial point of view. Had he ample resources he would have undoubtedly undertaken production in much larger volume and developed distribution and sales proportionately. The Monitor distributor was another excellent instrument, but it was not widely known in the industry or to vehicle owners.

The first large contract obtained by the company was in 1908, with the Buick Motor Co. Other similar contracts were obtained, but while decided progression was made from one point of view the use of magnetos for producing engine ignition current was begun and increased with extreme rapidity. This limited the sale of timers for automobile vehicle equipment, and caused the company to develop business with builders of marine engines and railroads, for many thousands of cars for maintenance work, the type formerly known as "hand cars," are in use the world over. This market was developed to large proportions.

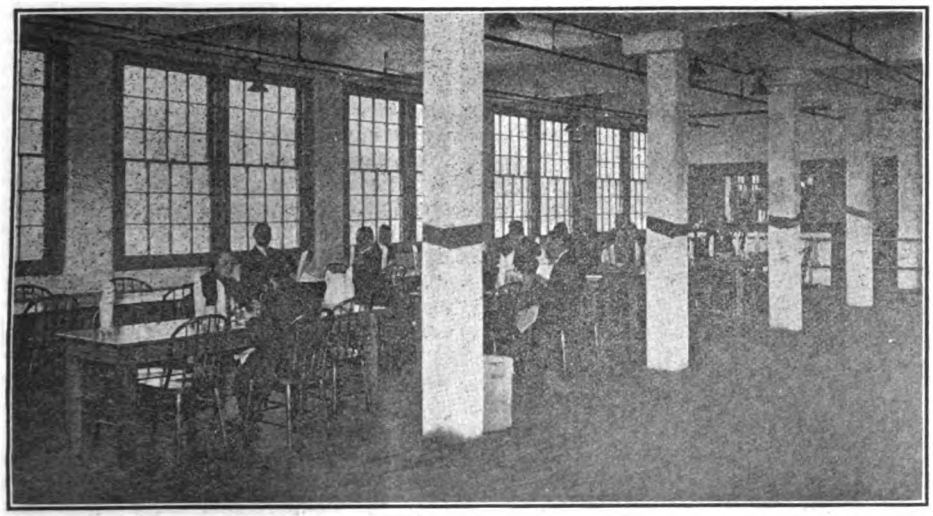
Consolidation in 1912.

In 1912 the company decided to engage in the manufacture of other automotive specialties and acquired the Motor Specialties Co. of Waltham, which was then manufacturing in large numbers the Flash auto-lighter, a device for lighting acetylene gas lamps. The trade name of "Mosco" was then adopted. This specialty had large promise, but automobile manufacturers abandoned gas for electric lighting and the demand so diminished that production was given over eventually. But this loss was after all a gain, for the electric lighting system required batteries and this impelled the use of timers and distributors instead of magnetos, so the pendulum swung back with a very



The Plant of the Motor Specialties Co. at Clematis Brook Station, Waltham, Mass., the Main Structure Being Concrete and Steel and Ideally Designed for Efficient Manufacturing from Every Phase of Sanitation.

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Restaurant and Kitchen, Where the Employees Are Served Meals at Cost, Seen from the Floor of the Recreation Room, Which Is Used for Dancing After Meals.

large market for Bemus timers, which had been proven a high grade instrument, and this has constantly increased.

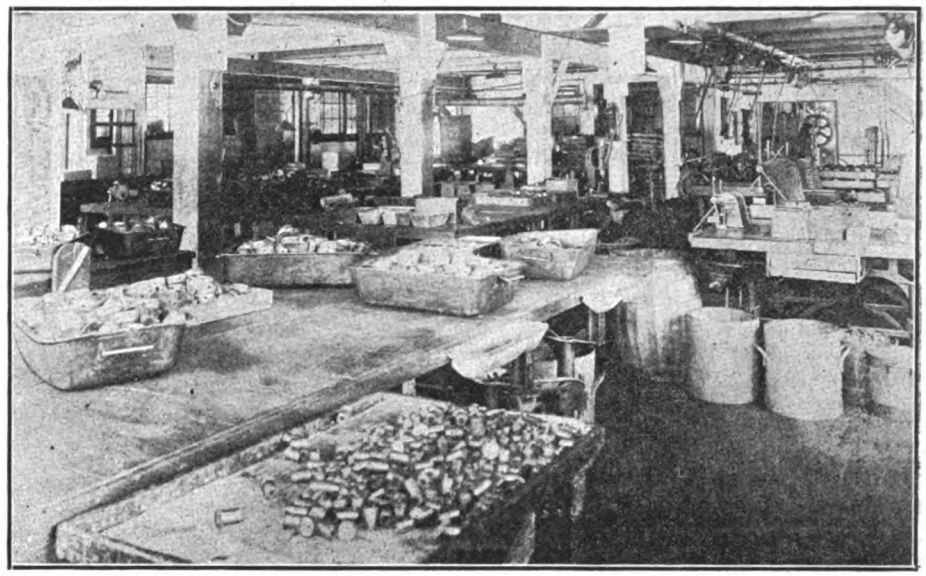
The Bemus timer had been meantime perfected in constructional detail so that it was a decidedly superior instrument, this being known as the universal type; the marine type was produced with and without circuit breakers, and a ball contact type was developed for Ford chassis. Still another timer was brought out for Ford chassis which is known as the Mosco No. 200. The production of timers was very greatly increased, and in addition the company manufactured wheel pullers, socket nut and bolt holders, and valve spring compressors for use with Ford chassis, and valve grinders, these being known by the trade name. Several other specialties were also devised, manufactured and sold as long as there was demand sufficient to justify specialization.

Production Growth Very Rapid.

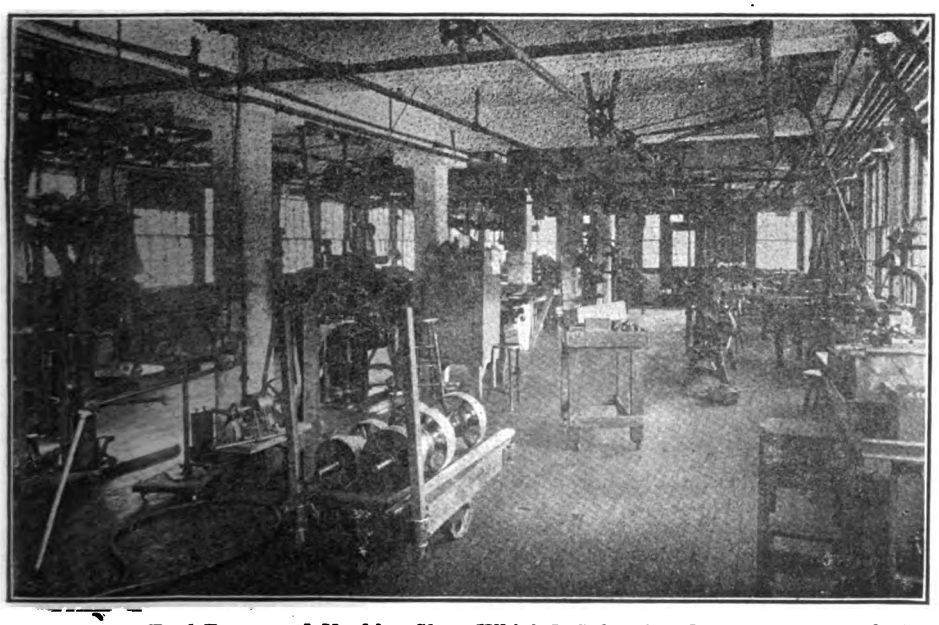
When the company acquired the Motor Specialties Co. at Waltham in 1912 a small wooden building was occupied and about 20 workers were employed. As the business developed the shop equipment and facilities were increased until the limitations of the plant had been reached, and in 1917 the site and buildings at Clematis Brook were acquired.

The property consists of 6½ acres of land about two miles from the center of Waltham in the direction of Boston, on the main track of the Massachusetts Central and Fitchburg lines of the Boston & Maine railroad system. On this are the two main buildings, one of which is four stories, constructed of steel and reinforced concrete, with front and rear two story wings. It has a floor area of about 35,000 square feet. This structure is admirably built and so designed with reference to lighting that every inch of floor space is available for manufacturing. As will be noted from an accompanying illustration, the window area is very large. The building is practically fireproof, there being very little of it that is in any way combustible, and it is protected by sprinkler systems, partition walls and metal sheathed automatic doors. Every provision that will make for the comfort and convenience of the workers has been made.

The first floor of this building is utilized for the automatic screw machine department, and the stock rooms for raw materials and manufactured stock to be assembled, while the power and heating plant is in the rear wing. On the second floor is a tool room for the drill press,



Looking Through a Part of the Timer Assembly Department. The Plant Has a Production Capacity of 3500 Timers a Day, or More Than 1,000,000 a Year.



Part of the Tool Room and Machine Shop, Which Is Splendidly Equipped and Perfectly Lighted, Two Factors That Make for Economy and Efficiency.

punching press and lathe rooms, the timer manufacturing and assembling department, the shipping department, the office of F. C. Hersee, treasurer and general manager of the company, and the office of the purchasing agent and the plant manager. On the third floor is the multiple spindle press room, a tool room, a stock room, the "tumbling barrel" room, the inspection department and the general offices. On the fourth floor is the kitchen, the restaurant and a rest and recreation room for the employees.

The other main building is wood, two stories height, and in this is the heat treating and oil and case hardening departments. A considerable part of the structure is used for storage. All the machines and tools are practically new and many of these have been adapted for work that is exclusive with this concern. The equipment was installed with a view of obtaining high efficiency and economy.

The company employs approximately 150 workers, a considerable number of

(Continued on Page 50.)

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PACKARD COMPANY DEVELOPING FOREIGN TRADE.

The Packard Motor Car Co. is opening an office in New York City in the interests of its foreign distribution. Fred Cardway, foreign distribution manager, is in charge. He will maintain direct touch with the American agents of many of the firms that represent the Packard company in other lands. The Packard company now has dealerships in 19 foreign countries and in Hawaii, the Philippines and Porto Rico.

Through dealership arrangements effected by Mr. Cardway, South American firms of international reputation recently have become associated with the Packard organization. Mr. Cardway made an extensive tour of South America two years ago.

Regarding trade relations between the United States and the South American republics, Jorge A. Mire, editor of La Nacion of Buenos Aires, has written the following:

"The future trade relations between the United States and the South American republics depend entirely upon the skill with which the North American manufacturers go into the struggle for the trade. Your European competitors have a great advantage, first, in that their investments down there are large, and, second, in that they have been accustomed to doing business with South American houses.

"The Packard Motor Car Co. is one of the representative American concerns that has had the insight to foresee the tremendous development of the automobile business in South America, and it is due in large measure to its careful analysis, not only of the competitive conditions, but also of the psychology of the South Americans, that the Packard already has made its name well known in the southern hemisphere.

"If other manufacturers will follow this lead it will not be long before South American merchants will give as much precedence to American claims as they now accord to those of European houses, and the trade which has been won during the lull occasioned by the great war will continue to be awarded to those American manufacturers who have exercised comparable intelligence and care."

GARAGE MEN AT GREENSBORO CLOSE SHOP SUNDAYS.

Acting on a petition signed by virtually all of the garage men in the city, the city commissioners of Greensboro, N. C., have made it unlawful for any garage, tire or accessory house to be open on Sundays, except from 8 to 10 a. m. and 6 to 8 p. m. to sell gas, repair a broken part or anything that has the appearance of work on or about a motor vehicle. The law carries a fine of $50 for each violation.

The Oldsmobile Co. of Washington, 1202 First avenue, Spokane, is handling the Federal truck.

Shields-Livengood Motor Co., Yakima, Wash., is handling Standard trucks and Dearborn truck attachments.

GLENN B. HILLER IS NELSON TRUCK SALES MANAGER.

Announcement is made by the Nelson Motor Truck Co., Saginaw, Mich., that it has engaged Glenn B. Hiller as general sales manager, and that he has assumed



Glenn B. Hiller, General Sales Manager, Nelson Motor Truck Co., Saginaw, Mich.

direction of the distribution of Jumbo trucks. Mr. Hiller's experience has been extensive and he is widely and favorably known, all of which qualified him for the work.

CAYWOOD AND BROGAN JOIN BLACK & DECKER MANUFACTURING CO.

D. G. Caywood, formerly sales manager for the Brunner Manufacturing Co., Utica, N. Y., has joined the organization



D. G. Caywood, Special Representative, Black & Decker Manufacturing Co., Baltimore, Md.

of the Black & Decker Manufacturing Co., Baltimore, Md., maker of portable electric drills and electric air compressors, and will serve as special representative to carry on the field work incidental to the distribution of Black & Decker specialties. Statement is made that Mr. Caywood was among the first to realize the wide possibilities of electric air compressors and has been actively engaged for 15 years in promoting their use. Graham W. Brogan, who was advertising manager for the Duesenberg Motors Corporation, has also been engaged by the Black & Decker company to direct its publicity. Both Mr. Caywood and Mr. Brogan will have headquarters at the Baltimore factory of the concern.

PENNSYLVANIA LEGISLATORS MAY LIMIT TRUCK WEIGHTS.

Much interest is being manifested by the motor truck trade in the attempt to have the Pennsylvania Legislature limit the size of trucks which may be used on the highways of the state.

Although haulage of trucks with 35-ton loads is against the law, they are constantly passing over the highways in the eastern part of the state. The gross weight of vehicles which may use the highways under the present law is limited to 24,000 pounds. The proposed limitation would insure trucks of a width which would not inconvenience other road users. Engineers declare that although the foundations for the roads have been made increasingly heavy each time they have been repaired or constructed anew, the highways cannot stand up under 30-ton loads.

A provision is proposed to require carrying lights on all vehicles at night, no matter how propelled.

MAY INCREASE MACCAR CAPITAL.

A special meeting of the stockholders of the Maccar Truck Co., Scranton, Pa., has been called to take action on a plan to increase the capital stock of the company from $300,000 to $500,000. P. L. Sylvester is president of the company.

NO CHANGE OF INDIANA TRUCK PRICES.

Announcement is made by the Indiana Truck Corporation, Marion, Ind., that present prices, which are $2150, $2600, $2800 and $4600 respectively for the 1, 1½, 2, 3½ and five-ton models, will remain unchanged up to June 1, 1919.

POWER VEHICLES WANTED IN NORWAY.

Consular R. C. Busser in a report to Washington states that Bergen, Norway, is an excellent market for passenger cars and motor trucks. Merchants and residents there have enjoyed prosperity.

Hoevel Bros., 1317 Chestnut street, St. Louis, has secured the agency for the Indiana truck. C. Walter Hoevel, a member of the firm, has been discharged from the United States Tank Service.

John Baker, Jr., has become general sales manager of the Kelly-Springfield Motor Truck Co.

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"A Simplified Dealers' Accounting System"

By Walter Engard.

IT IS conservatively estimated that fully 90 per cent. of the business concerns of this country do not know how much money they made during the past year, nor do they know what it has cost them to operate their business. The most of them have some kind of a record of receipts and expenditures, and now and then they strike a balance. But it is absolutely necessary for business men to install some accounting method whereby they shall know and not merely guess at such important matters.

An almanac, which could be slipped into a convenient pigeon hole of the old fashion roll top desk used to be about the whole sum and substance of the bookkeeping system of a good many dealers. But with closer competition, higher costs of operation and a narrower margin of profit, most merchants are finding that they have to give more attention to their record system. The almanac, as a general ledger, has gone the way of the plump cats that used to doze in the best window displays.

The successful dealer will make it a point to know every day the important facts and figures of his business. Some of the figures he will know each day are:

(1) Total cash receipts.
(2) Total sales.
(3) Total cash disbursements.
(4) The daily cash balance.
(5) The daily bank balance.
(6) Accounts payable.
(7) Accounts receivable.
(8) Total purchases.
(9) Balance stock on hand.

But in order for him to know these figures each day he must first install an accurate and complete system of accounting.

This system should be simple, yet accurate, and easy to operate. It should be convenient and economical. It should afford the merchant protection and give all the information necessary for the successful management of his business. The best system for any business is one that will give this information with the least amount of effort.

It shall be my endeavor in this article to present to you a simplified system of accounting, taking it up step by step, so that it shall be thoroughly understood by all. This system is as complete and as accurate as any system you can install. With these records you will have before you the facts of your business in such a way that you will know what to do next in your merchandising, just what stock to push, what stock to buy, how each department is progressing, and a thorough knowledge of the important facts of the business. The whole thought in the devising of this system is to make it a guide to better retailing instead of a mere matter of record keeping. All the necessary details are cared for in such a simple manner that you will know each morning exactly how you stand. No dealer can direct his business properly without having just such facts constantly available.

Good management is not a matter of guess work. You don't use good judgment when you guess. There is but one right way to do a thing and there is but one right way to install a system of accounting properly. To give you a proper basis for future control of your business the system must be properly installed.

The first thing to do is to take a physical inventory of all stock on hand. This is the only way you can be sure that future information shown by the system is going to be accurate.

It will also be necessary to stock number every article of stock. This should be done before the inventory is taken or else right at the time the inventory is taken. Tickets upon which the name of the article, the manufacturer, the stock number, the cost and the selling price can be entered should be provided and then go through the stock giving each article its stock number. Articles of the same kind, make and size and price can bear the same stock number, but all articles of a different kind, price, make and size should bear a separate number. That is, all tires of the same brand and size and price will bear the same stock number, but tires of another brand, although they are of the same size and price, shall bear an entirely different stock number.

After all articles have been stock numbered you can then proceed with the inventory.

In taking the inventory it is best to use regular "Inventory Sheets," form No. 1 accompanying this article. These sheets are 8x11 inches. Now in taking the in-

INVENTORY ____ 19 ____

Sheet No. _____ Priced by _____
Called by _____ Dept _____ Extended by _____
Entered by _____ Examined by _____

Stock Number	Quantity	Article	Unit Cost	Unit Retail Price	Extended Cost	Extended Retail Price

FORM NO. 1

PURCHASE RECORD MONTH OF 19 ____

Date of Invoice	Number of Invoice	Bought of	Terms	Gross Am't of Invoice	Distribution by Departments						
					Auto	Truck	Tractor	Accessories	Repair	Livery	Expense

FORM NO. 2

Daily Sales Month 19

Date	Total Sales				Sales By Departments											
					Auto Dept.		Truck Dept.		Tractor Dept.		Accessory Dept.		Repair Dept.		Livery Dept.	
	Cash	Charge	Total	Cost of Sales	Sales	Cost of Sales	Sales	Cost of Sales	Sales	Cost of Sales	Sales	Cost of Sales	Sales	Cost of Sales	Sales	Cost of Sales

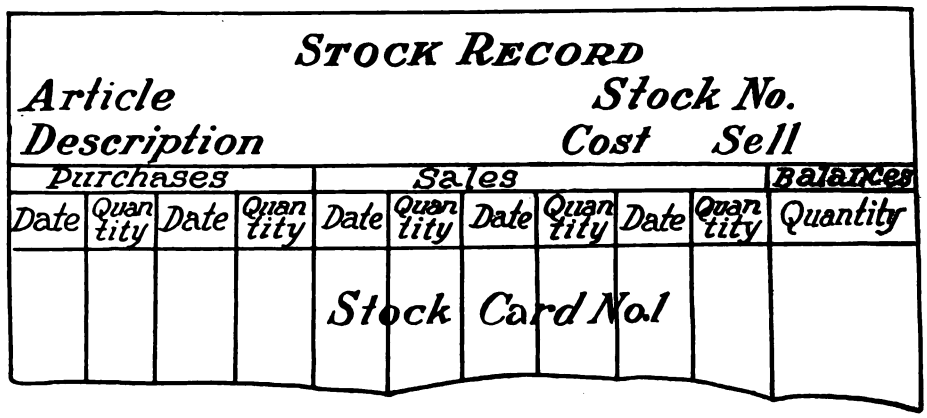
FORM NO. 3

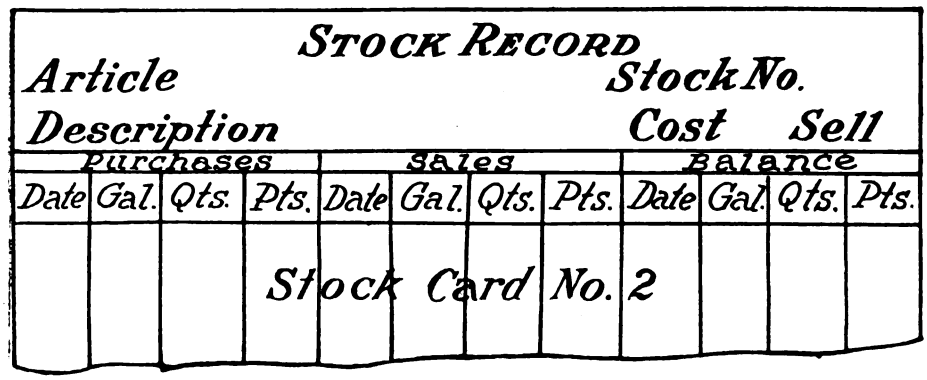
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ventory you will take the stock in each department separately and keep the inventory sheets of each department separate. You will note that upon this sheet you may enter the date upon which the inventory is taken, the sheet number, the name of the person who calls the goods off, the name of the person who enters the goods as they are called, and the name of the department in which the inventory is being taken. Each sheet should be numbered so that if one should become lost you will notice that one sheet has been lost and look it up or else take the stock over again.

Upon the body of this sheet will be entered the stock number of the stock, the quantity in stock, the name of the article, the unit cost and the unit retail price. The extended cost and extended retail price will be left for the proprietor to fill out or some one well posted on prices.

As soon as the inventory is finished you will then fill out a "Stock Record" card, illustrated by the accompanying cut, for every article, using card No. 1 for all such articles as tires, spark plugs, tubes, etc., and card No. 2 for gasoline and oils, entering upon these cards the name of the article, the stock number, the cost and the selling price, also a description of the article. Then from the





inventory sheet you will enter the total amount on hand under the heading "Purchases" in the column marked "Quantity." These cards provide for a perpetual inventory of all stock and when given your careful attention each day they will show you at any time the exact amount of each article you have on hand. These cards should be kept in an index file and filed alphabetically, making them easy to find.

In using this system it is necessary to have a sales slip made out for every sale, whether it be for 10 cents or $10, for cash or charge. The salesman will enter upon this sales slip the name of the article, the stock number and the price received. These sales slips will then go to the office and there kept until the close of the day. When business is over for the day you will take these sales slips and total the number of each article sold and turning to the "Stock Record" cards of all articles sold you will enter on each, under the heading of "Sales" the number sold. The column headed "Balances" is provided so that you can carry out the balance stock on hand at the close of each week.

When a new supply of any article is purchased you will enter the amount on the card under the heading "Purchases," entering the date and the quantity.

These cards shall prove a great help in buying, for when placing an order for any particular article you will turn to your Stock Record card for that particular article and there you have the amount you have on hand, and from the sales record you can gage the sales possibilities of that article and avoid overbuying.

Form No. 2 of this system is known as the "Purchase Record." This form provides for keeping an accurate record of all purchases. All invoices received for purchases will be held by the office until the goods have been received and the invoice checked and O. K. Then as soon as the invoice has been O. K. a record of the purchase will be entered upon this form, entering the date and number of the invoice, the name of the manufacturer purchased of, the terms of the purchase and the gross amount of the bill. Then you will distribute the purchase to the different departments, charging each department with the amount of the articles billed on the invoice that go into the department. All articles billed on the invoice which are to be used in the shop, such as waste, oil, etc., will be charged in the last column headed "Expense" and will then be transferred to the Expense Sheet, form No. 4, which will be taken up later. Any cash purchases made will be entered in the same manner.

With form No. 3 you are able to keep an accurate record of the sales in each department, also the cost of those sales, enabling you to determine the gross profit made in each department. Cash and charge sales will be kept separate for the entire business, but not so for each department. At the close of the day you will take your sales slips and divide them according to departments and total them and you have the total sales for each department. Then taking the "Stock Record" cards for the articles sold you will take off the cost price of the article sold and total them and you have the total cost of the sales, which is entered in the column headed "Cost of Sales" for each department.

Now with form No. 4 you are able to keep the expense in each department separate. Under the heading "Date" will be entered the date upon which the expense is paid for. Under the heading "Item" will be entered the item of expense, as labor, rent, advertising, etc., and under the heading "Amount" will be entered the total amount paid out. At the close of the month when this column is totaled you have the total expense for the business. Under the heading "Charge to Departments" you will distribute the expense charges. In the case of salaries you will charge each department with its full share of the salary expense. Rent will be distributed to the different departments according to the space they occupy. Advertising will be charged to each department according to the space used for each department. Every item of expense should be charged into the expense account somewhere. Office expenses will be apportioned to the several departments according to the volume of business done.

Form No. 5 is the "Sales and Recapitulation" sheet and provides for showing the progress of the business month by month. Under the heading "Sales" will be entered the sales for each department, opposite the name of the department and under the month during which they were made. Under the heading "Cost" will be entered the cost of those sales. These

(Continued on Pages 40 and 41.)

Expenses — Month of 19__

Date	Item	Am't	Charge to Departments					
			Auto Dept	Truck Dept	Tractor Dept	Accessory Dept	Repair Dept	Livery Dept
			FORM	NO. 4				

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COLORADO FARMER USES TRUCK TO DRILL WHEAT.

A Colorado farmer told W. L. Kissel, secretary and treasurer of the Kissel Motor Car Co., Hartford, Wis., how he used to advantage a motor truck in connection with his farming. The farmer said:

"With a big tractor pulling two wheat drills I am able to drill 30 acres of wheat per day. When employing a tractor it is necessary to have a truck in attendance to bring the wheat to the drill, as the tractor has no way of carrying it. Placing the wheat in the field ahead of the tractor proved impracfical, as the stock invariably got into it. Also the tractor was too heavy and packed the ground too much.

"The next day I attached a Kissel 3½-ton truck to one wheat drill, with the result that I went twice as fast as I did the day before with the tractor, therefore, doing as much work in one day with the truck and one drill as I did with the tractor and two drills. The truck carried the wheat, thereby eliminating the necessity of having an attendant truck. Also the truck did not pack the ground as much and the operating expense per day was very much less than that of the tractor."

HIGHWAY CONVENTION AT KANSAS CITY.

Thirteen transcontinental and interstate highway associations of the United States are to be represented at the convention of highways associations in Kansas City, Jan. 21. The purpose of the meeting is to perfect a league of the active, specific highway associations of the United States. Any organization active in the promotion of the construction of a definite, specific and uniformly marked highway not less than 500 miles long, passing through not less than three states, is eligible to attend and is entitled to one vote for each state through which the road passes.

Tractor Schools to Train Soldier Operators

Special opportunities to women and disabled soldiers to become expert in operating tractors will be furnished by the State of New York, according to announcement made by Calvin J. Huson, director of the Bureau of Production of the New York State Food Commission. At least 20 tractor schools will be opened by Mr. Huson during the winter and women and disabled soldiers will be especially urged to attend.

Farmers of New York state ordered so many tractors last year that the number in operation in 1919 will be more than double the number operated during the past season.

Early last year several tractor schools were instituted under the auspices of the State Food Commission as a means of increasing food production and counteracting the shortage of farm labor. Mr. Huson states that the schools were a success from the start, and out of 1200 students who attended more than 1000 were awarded certificates of proficiency upon completing the course.

Only men students were enrolled, but this year women will also be permitted to attend. It is expected that a large number of disabled soldiers will take advantage of the opportunity of learning something that will mean a good livelihood for them.

The only expense attached to the tractor course is an entrance fee of $1 for each student, and this amount will be refunded when the course is completed. The schools this winter will be conducted along the same general lines as those held last winter. Morning, afternoon and evening sessions will be held.

Both the machines and experts will be furnished by manufacturers of farm tractor machinery. The experts will explain the practical operations of the machines and oversee the practical work. The schools will be located at such points in the state where local conditions, such as buildings, railroad communications and probable attendance, would seem to warrant their establishment. County farm bureau managers will decide upon the best locations for the schools and advertise them among the farmers.



The Utility of the Beeman Garden Tractor Demonstrated by It Hauling a Single Plow to a Good Depth in a Sandy Soil, the Work Being Equal to What Is Done with a Plow and Horse.

NO RESTRICTIONS ON RUBBER IMPORTATIONS.

Restrictions upon the quantity of balata, gutta-percha, gutta-joolatong and gutta-siak, which may be imported from overseas, have been removed. License when granted will still provide that the bills of lading be indorsed to the Rubber Association of America, Inc. Announcement to this effect has been made by the War Trade Board.

It is also announced that the War Trade Board has withdrawn the government option prices and will require no further undertaking relative to maximum prices. However, this relaxation does not authorize the importation of any shipments of balata, gutta-percha, gutta-joolatong and gutta-siak from any country other than the primary or overseas markets.

The War Trade Board will not consider applications for import licenses for shipments now in countries other than the primary or overseas markets until after March 19, 1919. The same policy will be applied to applications for licenses to import shipments of balata, gutta-percha, gutta-joolatong and gutta-siak now in the United States which have been in violation of the regulations.

TWO WEEKS' TRACTOR COURSE AT IOWA STATE COLLEGE.

A series of two-week courses in the use and care of the tractor will be conducted by the Iowa State College at Ames. Members of the engineering faculty will have charge of the courses, which will cover construction of engine, ignition, carburetion, cooling, lubrication, clutch, transmission, frame and bearings, and instruction in operation, adjustment, location of trouble and repair work. The only cost to those taking the courses will be $7 to cover gasoline, oil and laboratory expenses. Laboratory work, as well as lectures, will be given.

AERIAL PUBLIC SERVICE FOR CANADIAN PROVINCES.

The Prince Edward Aerial Transportation Co., with a capital of $25,000, is being organized in Charlottetown, P. E. I. The initial route proposed is Moncton, Summerside, Charlottetown, Georgetown, Pictou, New Glasgow and Halifax, with a double daily service summer and winter. Mail and express will be handled first and passengers later. The plan to form the company was presented to business men of Charlottetown by Major Kennedy of the Royal Air Service, expert of the Aircraft Co., with headquarters in London.

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Personal News of the Industry in Brief

H. W. Clark, formerly in the advertising service department of the McGraw-Hill Publishing Co., in Chicago, has become manager of advertising for the Chicago Pneumatic Tool Co., Chicago, Ill.

Lieut. S. G. Hoffman has been dismissed from the aviation service and is back at his plant. He is president of the S. G. Hoffman Magneto Co., St. Louis, Mo.

Charles A. Marien has become associated with the H. & H. Machine Co., St. Louis, Mo., as vice president. Mr. Marien was formerly superintendent of the Anheuser-Busch Brewery Garage, which cares for more than 100 trucks and cars of many makes.

Sergt. Max A. Wiltinsyein has rejoined the Wellington Motor Car Co.'s staff in St. Louis. He was recently discharged from the Machine Gun Officers' School at Camp Hancock, Ga.

Ralph P. Greene has resigned his position with the Motor Car Equipment Co., Boston, to accept the management of the accessory department of the Wetmore Savage Co., Boston.

Homer Hilton, for some years identified with automobile advertising in the eastern and middle west trade circles, has been made sales and advertising manager of the Oshkosh Motor Truck Manufacturing Co., Oshkosh, Wis. The company manufactures four-wheel drive trucks.

Frederick W. McIntosh, who was formerly with the Clemms Auto Co., Des Moines, Ia., is now located at Philadelphia, Pa., as sales manager of the Nash Motor Co. Mr. McIntosh resigned from the Des Moines organization to join the Y. M. C. A. in its army work.

John E. Genn died at his home Dec. 15. He was one of the first 10 members of the Stewart-Warner organization. His position there was successively that of engineer, assistant chief engineer, chief inspector and chief engineer. The latter he held at the time of his death.

Fred N. Coates, for six years in the sales department of Willys-Overland, Inc., has resigned to accept a position in the sales department of the Chevrolet Motor Co. He expects to be located at the Chevrolet New York headquarters, 57th street and Broadway.

W. E. Carpenter has sailed for England and will devote his time in gathering data as to the field there for American tractors. He is manager of the tractor department of the Allied Foreign Trade Corporation.

George Simons, associated with the Edison Storage Battery Co. for the past three years, has been appointed district sales manager of their Detroit district. He succeeds Bertram Smith, who has gone to the main office at Orange, N. J. Mr. Simons has had valuable experience in storage battery practise and previous to his coming to the Edison Storage Battery Co. was for nine years associated with the old National Battery Co., Buffalo, N. Y., and the United States Lighting and Heating Co.

G. W. Werden is now export manager of the Denby Motor Truck, Detroit. His headquarters are in New York City.

A. W. Tyler has been elected vice president and general manager of the C. A. S. Products, succeeding the late James W. Graham.

A. Z. Zimmerman has resigned as treasurer and director of the Continental Motors Corporation, Detroit, Mich. He is succeeded by G. W. Yeoman, who has been elected treasurer of the corporation, and who will continue to act as director of sales and advertising. W. R. Angell was elected assistant treasurer and a director.

L. E. Trent has been appointed secretary and general manager of the Common Sense Gas Tractor Co., Minneapolis, Minn. He succeeds H. W. Adams.

B. W. Knowles is now chief engineer of the Baker R. & L. Co., Cleveland, O. He was formerly chief engineer and factory superintendent of the Electric Products Co. maker of battery charging apparatus.

Gard Gale has become associated as general sales manager of the Commerce Motor Truck Co., Detroit. Mr. Gale was a member of the firm of Eastman & Gale, Indianapolis, Ind., distributor of Dort cars and Commerce trucks.

T. T. Fauntleroy has assumed the duties of sales manager for the Lakewood Engineering Co., Cleveland, O. His headquarters are in Philadelphia. He was formerly New York branch manager for the Gurney Ball Bearing Co. and later manager of the central sales district for the same company.

P. H. Garber has resigned as manager of the Peoria, Ill., branch of the J. I. Case Co. to take a position as sales manager for the Illinois Silo and Tractor Co., Bloomington, Ill.

Lieut. T. W. Cushing has returned to his duties as vice president and sales manager of the Maibohm Motors Co., Racine, Wis.

Prescott C. Ritchie, western representative of the Westinghouse motor car equipment department, has moved his headquarters from Indianapolis, Ind., to Chicago.

A. C. Stebbins has been appointed general manager of the Auto Body Co., Lansing, Mich., succeeding H. E. Bradner.

E. G. Gunn has become assistant engineer for the Packard Motor Car Co., Detroit, Mich. For a number of years he has been identified with the Northway Motor and Manufacturing Co., Detroit; the Premier Motor Corporation, Indianapolis, Ind., and in other designing work.

Capt. Edgar L. Vail will soon return to his work as head of the Automobile Equipment Division of the Waltham Watch Co., Waltham, Mass. He is now stationed at Boston and is serving on the Adjustment Board straightening up government contract relations.

Charles O. Rowe will have charge of the Philadelphia branch office of the Hess Steel Corporation. The office is to be at 517 Widener building.

Ralph E. Keller, who was formerly general manager and vice president of the Martin V. Kelly Co., has become western manager of Frank Seaman, Inc., and will make his headquarters at the Chicago office. In addition to the Studebaker, the Seaman agency handles such accounts as the General Electric Co., Hess-Bright and S. K. F. Ball Bearing, H. W. Johns Manville and Republic truck. Mr. Keller has had long experience and is thoroughly suited to the work of carrying on the western development of the Seaman business in the way that it is planned.

H. C. Dunning is now production manager for the William Small Co., Indianapolis, Ind., which recently took over the manufacture of the Monroe. He has had 12 years of manufacturing experience, having been identified at different times with the Chevrolet Motor Co. and the C. A. S. Engineering Co., all of Flint, Mich. Mr. Dunning was also factory manager of the Chevrolet Co.

Charles Miller, formerly associated with the Miami Cycle and Manufacturing Co. at Mittletown, O., has joined the Willys-Overland forces as assistant to C. O. Miniger, vice president in charge of production.

E. I. Danaher has been released from the machine gun service in the U. S. army and will rejoin the Newell Co. Before joining the army he was secretary of the company.

O. J. Rhode has been promoted to the office of vice president and general manager of the Wire Wheel Corporation of America, controlling all company branches and export. He will be located at Buffalo.

Robert L. McCrea is now associated with the Cadillac Automobile Co., succeeding H. W. Spalding, who takes charge of the Chevrolet retail distribution in St. Louis. Mr. McCrea has sold Packards for 14 years.

Horace N. Trumbull has been dismissed from the Engineers Officers' Training School at Camp A. A. Humphreys, Va., and has been appointed advertising manager of the Wellman-Seaver-Morgan Co. of Cleveland, O. Before entering the service Mr. Trumbull was advertising manager of the SKF Ball Bearing Co., Hartford, Conn.

Norman S. Ross is now in charge of the new San Francisco office of the Wellman-Seaver-Morgan Co., at 415-417 Rialto building. Mr. Ross will give prompt attention to business originating from California, Nevada west of the 115th meridian, lower California and the counties of Josephine, Jackson and Klamath in Oregon.

Leo N. Burnett has been released from active service in the navy and returns to the Cadillac Motor Car Co. He will have charge of the advertising department. John A. Cleary took Mr. Burnett's position for the duration of the war and came from the Automobile Sales Corporation, Philadelphia, Pa., and has again taken up his duties as sales promotion manager of the concern.

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Charles B. Ennis is now general manager of the Anderson Motor Sales Co. He was formerly sales manager of the company.

Lieut.-Col. J. A. Mars has been appointed as director of the Bureau of Aircraft Production. He takes the position of W. C. Potter, who was acting director.

E. J. Copeland has become vice president and general manager of the Kelvinator Corporation, Detroit, manufacturer of Kelvinator refrigerating units. For eight years he has been associated with the General Motors interests in the capacity of purchasing agent. A. H. Goss, formerly associated with Chevrolet interests, is vice president of the company.

T. J. Turk has resigned as assistant general manager of the Inter-State Automobile Co. He was formerly connected with the Kissel Motor Car Co. and the General Motors Truck Co. He was the designer of the present Inter-State model.

Frank B. Ruoff has been appointed manager of the Klaxon general sales office, a new office opened in Detroit. Headquarters will be at 3066 West Grand boulevard. He was for several years in charge of the Detroit territory for the Klaxon company, Newark, N. J.

Roger J. Gilmore is now president of the Packard Motor Car Co. of New York. Since 1909 Mr. Gilmore has been with the Packard.

H. C. Gorman is now assistant in the patent research department of the National Automobile Chamber of Commerce. Mr. Gorman was formerly connected with the Motor Transport Corporation.

Pablo Homs has become associated as assistant foreign sales manager of the Cleveland Tractor Co., Cleveland, O. He has been identified with the sales of agricultural implements, automobiles and trucks in foreign fields since 1901 and will further the sales of the tractor in Russia, Scandinavia, Holland, Dutch East and West Indies, Spain, Portugal, Japan, China, Manchuria, the Philippines and Corea.

Geo. H. Treviranus will assume the duties of sales manager of the Gemco Manufacturing Co., Milwaukee, to succeed L. A. Raasch, who has resigned to become affiliated with Walden-Worcester, Inc., Worcester, Mass. Mr. Treviranus is thoroughly conversant with the Gemco policy from having been the advertising and export manager during the past 2½ years. He previously conducted for five years sales campaigns for the Evinrude Motor Co., who are the manufacturers of the famous detachable row boat motor.

T. B. Fogg has been appointed branch supervisor of the Garford Motor Truck Co., Lima, O., and is head of a new department of supervision.

H. Jerry Hall has left the Mechanical Belt Co. and has entered business for himself as the Jerry Hall Tire Co., St. Joseph, Mich.

W. L. Towne has become associated with the advertising force of the General Electric Co. at Schenectady. His duties will be very important and under the direction of F. H. Gale, advertising manager. Mr. Towne has been advertising manager of J. Austin Co. of Cleveland.



Frank E. Wing, Agent for Hurlburt Trucks.

Frank E. Wing, Boston, Mass., who has handled the Marmon for many years and recently took over the Hurlburt truck, has moved from Commonwealth avenue to a new building on Boylston street, at the entrance of the Fenway. The new quarters provide space enough for displaying the trucks.

F. J. Pardee has assumed the duties of western sales manager of the Diamond T Motor Car Co. and will open headquarters in San Francisco. For the past three years he has been general sales manager for the company at Chicago. A. J. Whipple, who has been a special representative of the company in Washington, D. C., has been made general sales manager.

William Ryan has been appointed sales manager of the Ford Motor Co., Detroit. He succeeds Norval A. Hawkins, who will give his attention to the foreign business of the company. P. E. Martin has been appointed general superintendent. He has been with the company since the first Ford car was assembled.

Milton J. Budlong announces his retirement as vice president and general manager of Gaston, Williams & Wigmore, and as vice president of the Globe line of steamships. He has been for many years president of the New York, Philadelphia and Boston Packard companies. Mr. Budling is well known to all the veterans in the automotive industry.



Milton J. Budlong, Former Vice President of Gaston, Williams & Wigmore.

Leo Lunenschloss has been promoted to the position of foreign sales agent of the Avery Co., Peoria, Ill. For six years he was manager of the principal Wisconsin sales office of the company. He is succeeded by R. B. Lyman, Watertown, S. D., as manager at Madison.

Herman N. Karp, one of the pioneers of the automobile industry, has opened a show room at 1676 Broadway. A full selection of used cars will be shown and Mr. Karp will specialize in the sale of the better grades of used cars.

E. B. Jones has assumed the duties as manager of the New York branch of the Firestone Tire and Rubber Co. of Akron, O. Mr. Jones possesses great executive ability and is well versed in the tire business. He was formerly a salesman in the Philadelphia Firestone branch, later assuming the management of the Brooklyn branch. Mr. Jones succeeds E. D. Studebaker, who was manager of the New York branch for five years.

Willard N. Love will become sales manager for the Johnson Automobile Co., St. Louis, Mo. He has been doing special work on war contracts.

Bert Leroux has joined the sales force of the Grasser Motor Co. to sell Oldsmobiles in Toledo, O. For several years Mr. Leroux has been connected with the sale of Overland cars. Later he was connected with the sales end of the Bliss Auto Co.

A. G. Cameron has been promoted to manager of the trade in Australasia. He has been manager of the Goodyear Tire and Rubber Co.'s branch in St. Louis. He will spend several months each year in the southern seas.

Honor Blocker, who has been assistant for the past two years, has been appointed advertising manager of the Republic Rubber Corporation. Mr. Blocker has made a marked impression in the advertising field.

John R. Eustis has been appointed secretary of the Metropolitan Consulate, one of the bureaus of the American Automobile Association. He is widely known in New York and has the task for many years to popularize the Importers' Salon at Hotel Astor during the New York Automobile Show. A. L. Westgard, transcontinental and touring authority, has been added to the staff of the A. A. A. Touring Bureau.

William Cairns has retired from active connection with the Detroit Pressed Steel Co., Detroit, Mich. He was general manager and is widely known among automobile parts producers. Mr. Cairns will take a rest during the winter at St. Petersburg.

P. S. Anderson, St. Louis, Mo., has been released from the Motor Transport Division and has resumed his former position as sales manager for the Packard Missouri Motor Co.

Earl Moore is now sales manager for the Superior Motor Car Co., St. Louis, Mo.

S. R. Jones has assumed the duties as district manager for the Moon Motor Car Co. in Eastern Missouri and Central and Southern Illinois. For several years he has been recognized in the motor industry.

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TO JOURNAL SUBSCRIBERS

In the following pages you will find listed, priced and described, a large number of articles that are used generally by vehicle owners. With hardly an exception jobbers and dealers can supply any of the parts, fittings, accessories, equipment, machinery, or tools dealt with.

The first installment of similar articles was published in October issue of the Automobile Journal. In the following numbers of this magazine many hundreds of these descriptions will be published and this great feature will be continued until practically all standard lines produced will be described.

In connection with the last installment a complete index will be published, giving issue and page number of the journal in which the articles and description was published. If prices or delivery conditions change in the meantime corrections will be made in the final index.

By retaining all numbers subscribers will have the most complete catalogue of desirable car equipment ever issued. It will have all the good features of a trade directory, a buyer's guide and a trade reference book.

Owing to new publishing requirements back copies of the Journal can not be supplied and we earnestly request all subscribers to file and retain copies.

IN THE FEBRUARY NUMBER OF THIS MAGAZINE 200 ARTICLES WILL BE DEALT WITH AND SPECIAL ATTENTION WILL BE GIVEN TO EQUIPMENT THAT WILL ADD TO THE CONVENIENCE AND COMFORT IN THE USE OF CARS DURING THE WINTER SEASON.

Owing to the uncertainty in securing material to this time it has been almost impossible for many manufacturers to be specific in stating delivery dates. By referring to articles you will find stated at the end of practically all descriptions the delivery conditions. When that detail is not mentioned it is assumed that any reasonable demand can be taken care of promptly.

Directory of Automobile Accessories, Parts and Supplies, with Descriptions, Illustrations and Prices

This is the fourth part of the directory of accessories, parts, fittings, machinery, tools, equipment and supplies which is being published in the Automobile Journal and Accessory and Garage Journal. Articles that are now in production or which are being carried in stock and that can be secured by jobbers and dealers are described and illustrated, and the prices and delivery conditions are stated. This information, which can be obtained through no other medium, is being compiled from the most recent advices direct from manufacturers.

Several thousand articles will be described in this way in the forthcoming issues of the two publications up to the opening of the Spring season. In the descriptions given, where no mention is made of the maker's ability to deliver goods, it is to be assumed that the same situation would exist as under normal conditions and that the article would be procurable, subject to the transportation and manufacturing considerations of the present time.

Owing to present publishing conditions, extra copies cannot be supplied, so subscription orders should be placed at once.

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The Akron-Williams Tire Rebuilding Stand—Williams Foundry and Machine Co., Akron, O.....31
Automobile Bucket—Martin Mfg. Co., Lancaster, O.....35
Auto Heel Rest for Fords—J. L. Lucas & Son, Bridgeport, Conn.....29
Automatic Light Bulb Case—Dover Stamping and Mfg. Co., Cambridge, Mass.....38
The Badger "Two-Wheel Drive" Differential—Lewis Differential Co., Milwaukee, Wis.....38
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Banker Windshield—Banker Windshield Co., Pittsburgh, Pa.....34
Beach Bushing Press—Greb Co., 202 State St., Boston, Mass.....30
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Braender Tires—Braender Rubber and Tire Co., Chicago, Ill.....25
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The Brunner Air Compressor—Brunner Mfg. Co., Utica, N. Y.....25
Buffington Folding Chair—C. A. Buffington & Co., Berkshire, N. Y.....33
The Cathedral Bell—Cathedral Bell Mfg. Co., Baltimore, Md.....39
Century Cigar Lighter—Mabey's Electric and Mfg. Co., Indianapolis, Ind.....34
Columbia Gasoline Filter—Columbia Gasoline Filter Co., Inc., 30 Beach St., Boston, Mass.....26
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Curb Station Outfit—Black & Decker Mfg. Co., 304 Water St., Baltimore, Md. 24
Cylinder Grinding Machine—B. L. Schmidt Co., Davenport, Ia. 37
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Dover Light Bulb Case—Dover Stamping and Mfg. Co., Cambridge, Mass. 38
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Duplex Folding Basket—Planet Co., Westfield, Mass. 27
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Electric Glue Pot—Mabey Electric and Mfg. Co., 968 Fort Wayne Ave., Indianapolis, Ind. 26
Everlasting Hose—Chicago Tubing and Braiding Co., Chicago, Ill. 36
The Exy-Out Screw Extractor—Cleveland Twist Drill Co., E. 49th St. and Lakeside Ave., Cleveland, O. 26
The Fautless Pail and Funnel—National Mfg. Co., Des Moines, Ia. 27
F-F Battery Booster—France Mfg. Co., Cleveland, O. 29
Fitall Adjustable Toilet Kit—Eiseman, Kaiser & Co., 23-31 S. Franklin St., Chicago, Ill. 26
Free Air Unit—Gardner Governor Co., 126 Williamson St., Quincy, Ill. 29
Gasoline Storage Outfit—Wm. B. Scaife & Sons Co., First National Bank Bldg., Pittsburgh, Pa. 36
The Groetken Automatic Measuring Barrel Pump—Groetken Pump Co., Aurora, Ill. 39
The Guarantee Visible Pump—Guarantee Liquid Measure Co., Pittsburgh. 35
The Handy Service Cabinet—Stevens & Co., 375 Broadway, New York. 38
Hartford Auto Jack—Edward V. Hartford, Inc., 147 Morgan St., Jersey City, N. J. 28
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Imperial Primer—Imperial Brass Mfg. Co., 517 E. Racine Ave., Chicago, Ill. 34
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Inner Tube Case—Martin Mfg. Co., Lancaster, Pa. 32
The Invincible Tire Pressure Tester—United States Gauge Co., New York. ...30
The Johnson Electric Grinding and Buffing Tool—U. S. Electrical Mfg. Co., 450 E. Third St., Los Angeles, Cal. 33
The Lectrofilter Carriage Outfit—Black & Decker Mfg. Co., Baltimore, Md. 24
Leviathan Garage Funnel—Dover Stamping and Mfg. Co., Cambridge, Mass. ..26
The Liberty Plane—Defender Auto Lock Co., Inc., Marquette Bldg., Detroit, Mich. 36
Lighting System—Detroit Starter Co., Detroit, Mich. 28
The Manley 22-Ton Universal Auto Press—United Engine and Mfg. Co. 32
The Midway Ford Special Magnetiser—The Midway Mechanical Co., 1555 Selby Ave., St. Paul, Minn. 35
The Minute Demountable Wheel—Hill-Smith Metal Goods Co., 88 Pearl St., Boston, Mass. 22
The Motor Driven Visible Measure Gasoline Dispenser—Westinghouse Electric and Mfg. Co., E. Pittsburgh Pa. 31
The Mosco Floating Plunger Wheel Puller—Motor Specialties Co., Waltham, Mass. 32
Neville More Room Wheel—Neville Steering Wheel and Mfg. Co., Congress St., Detroit, Mich. 37
New Apco Products—Auto Parts Co., Providence, R. I. 25
Two New Apco Specialties—Apco Mfg. Co., Providence, R. I. 37
The New Era Foot Accelerator—New Era Spring and Specialty Co., 717 Mather St., Chicago, Ill. 31
The Panvar Car Refinisher—The Panvar Co., 618 Bulletin Bldg., Philadelphia, Pa. 31
The Petry Cut-Out—N. A. Petry Co., Inc., Philadelphia, Pa. 27
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Rock-A-Bye Auto Seat—The Perfection Mfg. Co., 2700 N. Leffingwell Ave., St. Louis, Mo. 38
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Scientific Garage Oil Heater—Scientific Heater Co., Cleveland, O. 25
See-Safe Windshield Wiper—Stadeker Metal Specialty Co., 19 S. Fifth Ave., Chicago, Ill. 36
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Singer Auto Traffic Signal—Singer Auto Traffic Signal Co., 2827 Locust St., St. Louis, Mo. 29
The Standard No. 102 Brunner Air Compressor—Brunner Mfg. Co., Utica, N. Y. 25
The Stenman Electric Valve Grinder—Stenman Electric Valve Grinder Co., Inc., 42 Southbridge St., Worcester, Mass. 39
The Stow Electric Buffer—Stow Mfg. Co., Binghamton, N. Y. 39
The Swan Fan Belt Adjuster—Mechanical Belt Co., 1202 Frederick Ave., St. Joseph, Mo. 26
3A Company Flag Holder—American Automobile Accessories Co., Cincinnati, O. 24
Toledo Air Compressor—Toledo Gas Engine Works, Toledo, O. 27
Tomahawk Graphite Spring Lubricator—Charles W. Manzel Co., 309 Beard Ave., Buffalo, N. Y. 26
The Tube Deflator—Williams Foundry and Machine Co., Akron, O. 26
Twin Spring Shock Absorbers for Fords—Twin Spring Co., 1000 Boylston St., Boston, Mass. 37
The Vaporator—Vaporator Mfg. Co., 2727 Washington Ave., St. Louis, Mo. 32
The Vaporspray—Vapor Valve Co., 2820 N. Spring Ave., St. Louis, Mo. 35
Victorlene—Victorlene Co., 39 Pearl St., Boston, Mass. 27
The U. S. Dash Board Sight Feed Oil Gauge—United States Gauge Co., 67 Wall St., New York. 34
The Universal Cylinder Reboring Tool—Universal Tool Co., Detroit, Mich. 33
The Universal Hose Clamp—Universal Clamp Mfg. Co., 150 Broadway, Concord, N. H. 24
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The Wagner Rectifier—Wagner Electric Mfg. Co., St. Louis, Mo. 31
The Walker Steebilt Shock Absorbers for Fords—Walker Mfg. Co., 31 Hamilton St., Racine, Wis. 30
Warnola Warning Signal—Warnola Mfg. Co., 73 Wooster St., New York. 30
The Way-A-Head Auto Lens—Way-A-Head Light Co., Pittsburgh, Pa. 37
The Wayne Pump—Wayne Oil Tank and Pump Co., Fort Wayne, Ind. 30
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Wood's Everloc—W. C. Wood, 74 Western Ave., Minneapolis, Minn. 21
Wrench Display Set—Walden-Worcester, Inc., Worcester, Mass. 32
Wrought Steel Back Catch—Stanley Works, New Britain, Conn. 34
York Carburetor Perfector—York Carburetor and Auto Accessories Co., Inc., 680 Woodward Ave., Detroit, Mich. 28

"Norwesco Utility Black" meets the big need for an all around utility enamel which the motorist can use for retouching all shabby metal parts of an automobile and that will be satisfactory for painting the engine. It is air drying and possesses heat baking qualities. After several

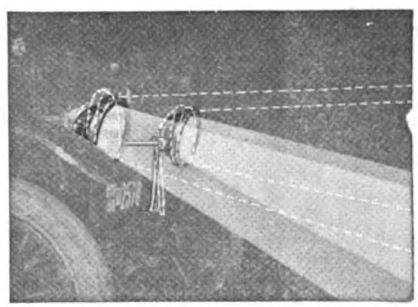


months of testing and experimenting the Norwesco Laboratories have now added to their line of chemical specialities "Norwesco Utility Black." A black enamel designed for retouching all metal parts of an automobile such as the lamps, hood, radiator and fenders.

Manufactured by the Northwestern Chemical Co., Marietta, O. Pints and half pints retail for $1 and 60c respectively.

The prices quoted in connection with the descriptions of accessories and equipment are subject to change at any time. When ordering learn new prices as material and labor conditions are constantly changing.

Pennock Headlight Tilter. A new solution for the headlight problem is given in the Pennock Headlight Tilter, a device for controlling the headlights of practically any make of car. The apparatus consists of a pair of headlight brackets mounted on the mudguards and connected with a foot pedal in such a manner that by pressing upon the pedal the brackets are tipped forward. With the pedal released the headlamps are in normal position throwing the beam of light straight ahead. For driving in cities or towns the lights may be locked so that the beam does not rise above the height prescribed by law. When meeting another automobile the lights may be depressed so that the rays do not dazzle the passing motorist, yet illuminate the road ahead.



For illuminating the road when topping a hill the tilting device makes the lamps exceptionally convenient. Beyond the fitting of the foot pedal no alterations to the car are necessary.

Manufactured by the Specialty Manufacturing Co., Minerva, O. Price for Fords, $5.

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3A Company Flag Holder. There is a great demand for an inexpensive flag holder that will fit practically any automobile, and it is claimed that the 3A Company Flag Holder meets this demand. This



flag holder is made of polished nickel plated steel and clamps around the radiator filler pipe of practically any car. Each device is supplied with a lock washer and bolt.

Manufactured by American Automobile Accessories Co., Cincinnati, O. Price, 25 cents.

The Beach Universal Rim Tool is a device designed to eliminate all of the hard work encountered in removing tires from split rims. Every autoist who has been obliged to remove and attach a tire to a split rim realizes that the work requires considerable effort. The tire must be stretched and the rim locked.

The device consists of two clamps, which are actuated by a long lever. For removing the tire the clamps are put into place and the lever pressed downward. This action releases the rim by spreading it one-



quarter of an inch, raising it over the other edge two inches and carrying it by four inches, thereby contracting the rim sufficiently so that the tire can be easily removed.

The device is left in this position until the new tire is applied, when the action is reversed. It actually contracts and holds the rim, then expands and locks it in its true position in one operation without removing or changing the position of the clamps.

Manufactured by the Greb Co., 175 State St., Boston, Mass. Price, $7.50.

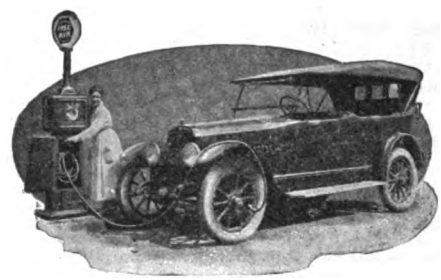
The Lectrofilater Carriage Outfit, as illustrated, fills the need for a portable air pump. It operates on a new principle, which makes possible its small size, light weight, large air volume and high efficiency. The motor will run from any 110 volt lamp socket, direct or alternating current (220 volt machines furnished when desired), and will pump any size tire to required pressure in a very short time.



The manufacturers guarantee every Lectrofilater to develop 125 pounds air pressure without overheating and to be free from imperfections in workmanship or material. All bearings, gears and pistons are automatically lubricated from a central source by the capillary system. There is no liquid lubricant or oil level to maintain.

Manufactured by the Black & Decker Manufacturing Co., Baltimore, Md. Price complete, $80; without carriage, $65.

Curb Station Outfit. A new and decidedly appealing device for automobilists has recently been placed on the market that should be of interest to every type of business by reason of its advertising value. It is called the Curb Lectrofilater Station and is designed for the distribution of free air.



The station is massive and rugged in proportions, at the same time it has been designed with an eye to beauty, simplicity and effectiveness. Its lines are symmetrical and pleasing and the deep green enamel over its highly finished surface gives it a quiet dignity that is accentuated by the large beveled glass pressure dial and the substantial opalescent globe surmounting the taper column.

It is automatically operated day and night. The presure dial in the upper front door is flooded with light by a lamp concealed inside the cabinet and the tire valve connector on the end of the hose is so arranged that the pressure in the tire before starting to inflate is registered on the dial.

The upper compartment is kept locked and contains a standard No. 2 Lectrofilater. The lower compartment, which is also provided with a lock and key, is normally left unlocked and contains a 25-foot length of heavy duty, triple braided hose and a rack for holding it when not in use.

Directly over the hose rack is an electric switch conveniently located for starting and stopping the Lectrofilater when the large dial registers the desired pressure.

The whole apparatus is so arranged as to preclude the possibility of anyone tampering with the working parts and with the exception of the operating switch and hose connection, all parts are locked in the compartment. The device operates on either direct or alternating current and is said to be absolutely safe.

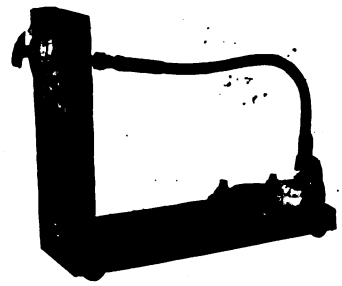
The Northern Electric Co., Ltd., Montreal, are the exclusive Canadian distributors.

Manufactured by the Black & Decker Manufacturing Co., 304 Water St., Baltimore, Md. Price quoted at request.

Comco Auto Lock. A lock that is said to be 100 per cent. thief proof is now being sold under the trade name of Comco Auto Lock. This device is very simple and is scientifically constructed.

It consists of a gasket like attachment, which is fastened between the carburetor and intake manifold or engine. This gasket is cast integral with the lock mechanism housing and is fitted with a shutter which cuts off all the gas supply to the engine when the device is locked. From the lock mechanism a flexible connection leads to a combination dial on the dashboard, which may be set to a great number of combinations.

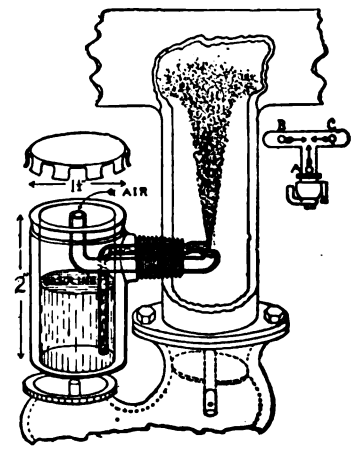
To lock the device a turn of the combination knob is all that is necessary. No



gas can then reach the engine from the carburetor. The manufacturers claim that the device cannot be picked or broken without damaging the engine fittings, and is so simple that it may be operated in the dark by a person familiar with the correct combination. The illustration shows the dealer's display stand, which is furnished to any one ordering 12 or more locks.

Manufactured by Combination Auto Lock Co., 1134 Chestnut St., St. Louis, Mo. Standard lock for any car, $10. Ford special, $7.50.

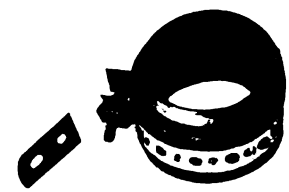
Atomising Primer. Longest Atomizing Primer is designed to make the starting of an engine in cold weather an easy operation, by making it possible to thoroughly vaporize the fuel before it is sent into the



cylinders. The device is attached to the intake manifold, and is made in two models. Model one is filled by hand, while model two is connected directly with the gasoline supply system.

Manufactured by Longest Bros Co., Louisville, Ky. Price for model one, $2.50; model 2, $5.

The Universal Hose Clamp is designed for the man who does not want to carry on hand an assortment of various sizes of clamps. It is said that this clamp combines all the good and desirable features of other types and besides is adaptable to



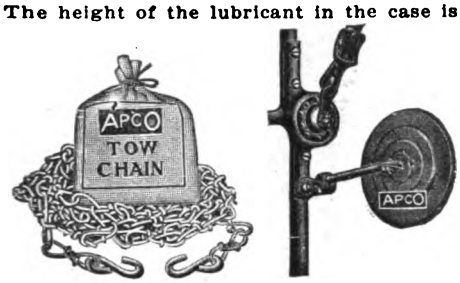
all sizes and shapes of hose. There is only one piece to handle, it being slipped around a pipe no matter in what position it may be. It tightens with very little effort and grips the hose evenly all around.

Manufactured by the Universal Clamp Manufacturing Co., 150 Broadway, Concord, N. H. Price quoted at request.

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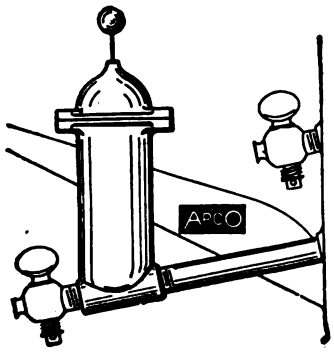
New Apco Products. Three new specialties for the Ford car have recently been put on the market and are shown in the illustration.

One of these is an all-metal oil gauge intended to be attached to the crank case. The height of the lubricant in the case is



indicated by a white ball, which is attached to a float inside the gauge. The usual draining petcock may be screwed into the gauge. The finish is black enamel.

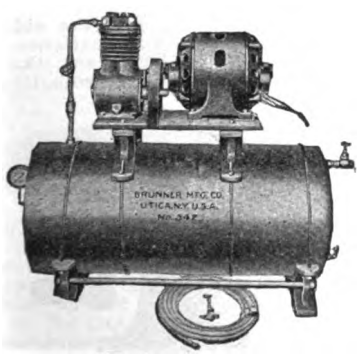
The Apco rear view mirror differs somewhat from the conventional type in that it is attached to the windshield supporting bracket by a screw instead of a clamp. The mirror glass is spun into the frame, 5½ inches in diameter of the reducing type. Finish is in black enamel.



The tow chain illustrated, the makers claim, is capable of supporting a strain in excess of 2900 pounds. The links are treated with a special material to make them rust proof. The chain, which weighs but four pounds, comes in a neat canvas bag.

Manufactured by the Auto Parts Co., Providence, R. I. Prices: Oil gauge, 50 cents; mirror, $1; tow chain, $2.50.

The Standard No. 102 Brunner Air Compressor has a capacity of 2½ cubic feet of free air per minute. It is geared by means of a cloth pinion gear and a cast iron spur gear to a ½ horsepower motor, bolted to a substantial iron base, and is



mounted on a 32-gallon welded open hearth flange steel tank tested to 300 pounds. Its height is 34 inches and occupies a floor space of 18 by 36 inches and can be attached to any lighting socket.

Manufactured by the Brunner Manufacturing Co., Utica, N. Y. Price with 110 or 220 volt direct current motor, $195. With one phase 60 cycle 110 or 220 volt A. C. motor (A. C. motors of other than 60 cycle at additional charge.) Price quoted at request.



Braender Tires have been manufactured for six years. The process of manufacture is the wrapped tread single cure process, which means that the tires are cured or vulcanized at one time in one heat, being wrapped in cloth. One of the strong claims is that they are cured in live steam, which leaves the natural oil in the fabric and gives the tires long life. An even pressure is secured at every point, assuring perfect adhesion and vulcanizing.

Manufactured by the Braender Rubber and Tire Co., Chicago, Ill. Price quoted at request.

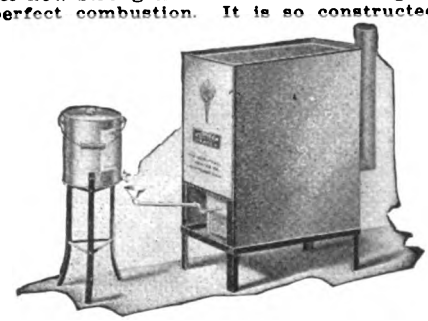
The Brunner Air Compressor is a portable outfit designed for inflating tires direct, without the aid of a tank or storage system. It is mounted on a substantial cast iron truck having three wheels, and is very durable and convenient to move about. The handle is strongly constructed of convenient height, and has substantial hooks for holding the electric cord and air hose when not in use. It is heavily built with standard No. 26 compressor, having accurately ground cylinders, pis-



tons and piston rings. The motor is specially built, fully enclosed, affording ample power for operation under all conditions, and it may be operated from any light socket. All accessories are included to make the outfit complete and ready to operate when removed from shipping crate. A small chamber is supplied to precipitate the moisture from the air before entering the tire.

Manufactured by the Brunner Manufacturing Co., Utica, N. Y. Price at request.

The Scientific Garage Oil Heater burns either fuel oil or kerosene and embodies a new principle of oil burning. The burner itself is wickless and sootless, and no matter how strong the flow of fuel it will give perfect combustion. It is so constructed



that all heat escapes from the top and none is radiated from the sides, thus making it practical for garages where there is little space between walls and car. It is built on the principle of the miner's safety lamp by which all air for combustion is taken through a fine gauze and through which flame cannot pass. Gasoline can be poured around the heater without danger of fire. The manufacturers claim a minimum use of fuel to heat the ordinary sized garage and eliminating danger of freezing, damage to body finish, etc.

Manufactured by the Scientific Heater Co., Cleveland, O. Price quoted at request.

Ignition Lock for Fords. The New York ignition switch lock for Ford cars is a non-pickable barrel lock built into a steel nickeled housing and of very compact construction. It is easily installed by removing the three screws which hold the name

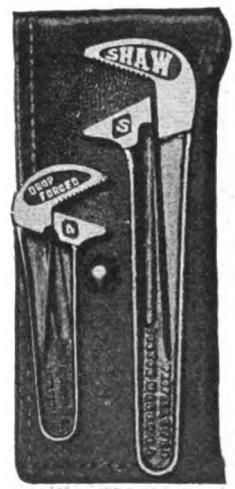


plate on the regular Ford switch and screwing the ignition lock in place. Less than five minutes are required to install it.

A three-lobed cam inside the switch forces outward three sliding members, which conceal and protect the retaining screws. They remain over the screws after the first operation of the switch and do not slide each time the key is turned. The key can only be removed when the switch is on the "off" position, when the cam prevents the lugs from being forced inwards.

Made by the New York Coil Co., 338 Pearl St., New York, N. Y. Retail price, $3.

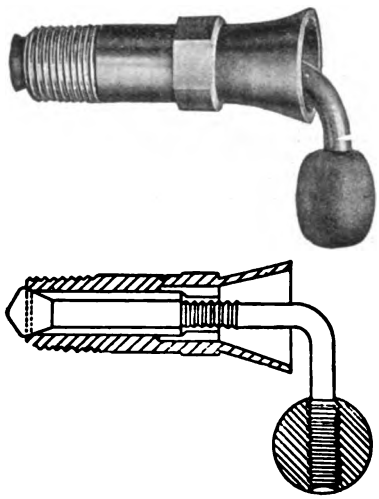
The Shaw Wrench. In the illustration is shown a handy one-piece wrench,



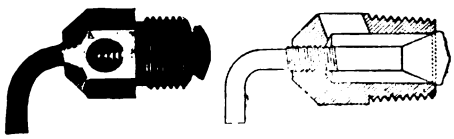
which is designed to accomplish any task that can be done with a Stilson, monkey, alligator or flat wrench. It will be noted that there is a slit, extending from back of the jaws down the handle. This peculiar construction permits light work to be handled with a light grip and heavy work with a powerful grip. The greater the pull required to loosen a fitting the more powerfully the jaw sets.

Manufactured by Shaw Propeller Co., Boston, Mass. Price quoted at request.

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Britton Drain Cocks. The illustration shows the Britton Priming Cups and drain cocks. The cross sectional cuts show the simplicity of design and the self-contained features. Any pressure on the stem tends to seat the valve rather than to off-seat it, consequently, as pressure increases, the valve becomes tighter.



Due to the combination of the cone seating and threading of the stem, both devices have a self-locking effect.

Manufactured by Peter A. Frasse & Co., Inc., 417-421 Canal St., New York, N. Y. Price quoted at request.

Tomahawk Graphite Spring Lubricator consists of a case in which graphite grease is inserted, and a double wedge spring separator, through which the grease may be forced in a thin stream. The back of the wedge is fitted with a striking head. When it is desired to use the device the car is jacked up and the tool inserted between the spring leaves,



either with the pressure of the fingers or a light tap of a hammer. The grease is then forced out by screwing up on the handle. A spring lubricant is put up in tube form, making it an easy matter to refill the container. Each tube is sufficient for 2000 miles of travel.

Manufactured by Charles W. Manzel Co., 309 Beard Ave., Buffalo, N. Y. Price, $1.25. Lubricant, 50 cents.

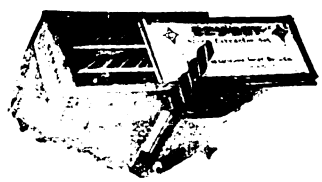
Leviathan Garage Funnel. To meet the demand for an extra large garage funnel the Dover Leviathan Garage Funnel has been designed. This device is fitted with a chamois skin filter across the bottom, stretched tight and supported by a wire rack, which while it prevents sagging, permits a filtering surface the full size of the funnel, thus insuring a rapid flow. It is made of extra heavy steel and thoroughly galvanized after it is made up, thereby giving it a durable and rustless coating.



The funnel part is made extra large and of sufficient capacity to take a five-gallon can of gasoline at a single pouring without having to wait for the contents to run through the strainer.

Manufactured by the Dover Stamping and Manufacturing Co., Cambridge, Mass. Price quoted at request.

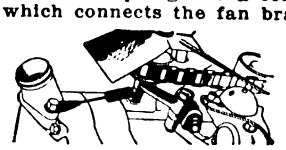
The Ezy-Out Screw Extractor is designed for the express purpose of removing broken screws of all kinds, than which there is no more exasperating job in machine work. The device is designed somewhat like a cork screw, biting its way into the broken screw and then backing it out on its own threads. It is necessary only to drill a small hole in the broken screw and give a slight twist to the extractor in order to seat it firmly. The



tighter the screw sticks the harder Ezy-Out grips and twists. The device is made of exceedingly tough steel, to withstand the strains to which it may be subjected, and it can be used on set screw studs, staybolts and screws of all kinds.

Made by the Cleveland Twist Drill Co., East 49th St. and Lakeside Ave., Cleveland, O. Price quoted at request.

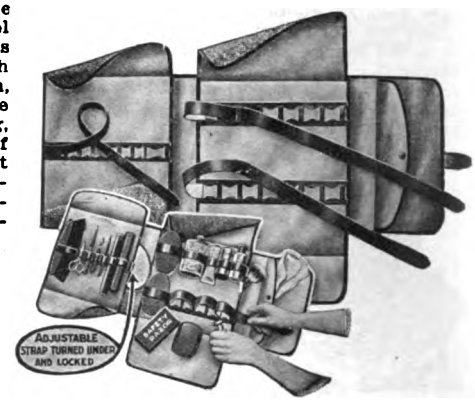
The Swan Fan Belt Adjuster, the makers claim, will increase the efficiency and prolong the life of any Ford belt by always keeping it at the proper tension. It consists of a coil spring and a convenient fixture which connects the fan bracket to



a stationary part of the engine. It is attached without special tools in less than five minutes.

Manufactured by the Mechanical Belt Co., 1202 Frederick Ave., St. Joseph, Mo. Price, 35 cents each.

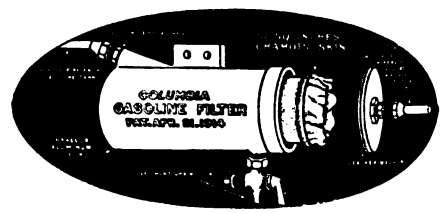
Fitall Adjustable Toilet Kit. For the convenience of the traveling motorist to store such toilet articles as he or she may desire, the Fitall Adjustable Toilet Kit makes a practical accessory. This toilet



kit is light, compact and made of a water proofed and flexible leather. The strap holders are so arranged as to be adjustable to different toilet articles. Fitall kits are made in many different styles, either empty to receive the fittings which are already in hand, or for new fittings, as may be selected.

Manufactured by Eisemann, Kaiser & Co., 23-31 S. Franklin St., Chicago, Ill. Price quoted at request.

Columbia Gasoline Filter. The embarrassments attendant upon poor and unfiltered gasoline is fully realized by motorists. In order to function properly the carburetor must be supplied with pure liquid, water or dirt fill up the intake valves and cause many troubles. The Columbia Gasoline Filter is designed for insertion in the gasoline line at any point between the tank and the carburetor, preferably near the latter, and is so arranged



that all of the gasoline passing through it is thoroughly strained, both through chamois and wire gauze. Due to its construction the straining surfaces are large and efficient. The device is easily cleaned and may be applied to any automobile.

Manufactured by Columbia Gasoline Filter Co., Inc., 30 Beach St., Boston, Mass. Price, $5.

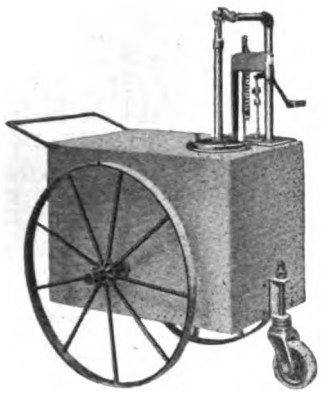
The Tube Deflator is a handy little device for use in repair shops and garages where much tire repairing or storing is done. To deflate a tube by the old hand method takes both time and patience. With the device illustrated, however, the tube is slipped over one of the projections on



the plate, then, by turning the handle, the tube is wound tightly around the two projections and the air is quickly exhausted. Practically any size tube may be deflated with the device, which may be placed on the bench or wall in any convenient position.

Manufactured by the Williams Foundry and Machine Co., Akron, O. Price quoted at request.

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Portable Lubricating Station. A practical portable lubricating oil service station on wheels is illustrated herewith. It is designed to facilitate the dispensing of lubricating oil. The tank, which has a capacity of 65 gallons, is made of 14-gauge blue annealed steel, with welded joints and mounted on two 30-inch steel wheels with a small wheel at the front for a guide. The pump is so designed that it discharges on one complete stroke of the plunger an accurate quart of oil. Either a pint or half pint can be pumped by a simple adjustment of the quantity lever, which is mounted at the side and easily accessible. A nickel plated anti-drip nozzle is furnished on the pump, so designed that it effectively stops the flow of oil when pumping ceases.

All of the oil is strained before passing through the pump, so that clean oil is had at all times.

Manufactured by S. F. Bowser & Co., Ft. Wayne, Ind. Price quoted at request.

The Faultless Pail and Funnel is designed to fill the demand for an easily carried radiator filler. It is a combination of funnel and pail, made of heavy water proof army duck with a galvanized hoop in the top and non-rustable valve in the



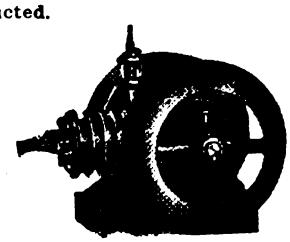
bottom. A pull on the string releases the valve in the bottom, allowing the water to flow through the small outlet tube.

When not in use the combination may be folded up and occupies but very small space in the tool kit.

Manufactured by National Manufacturing Co., Des Moines, Ia. Price, $1.

Toledo Air Compressor. An air compressor which is said to contain a number of interesting features in design is herewith illustrated. This compressor has two compressing strokes and its action is as follows: As the piston travels to the top of the troke a charge of air is drawn into the base of the machine. This charge is compressed at the downward stroke of the piston and forced into the cylinder, where it is again compressed at the up stroke and forced into the tank.

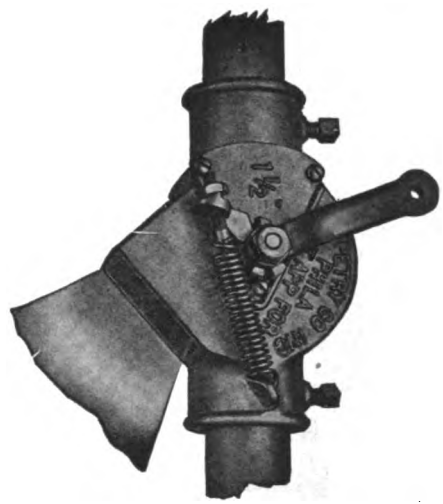
The cylinder has a three-inch bore and the piston a three-inch stroke and at 208 revolutions per minute fills a 12x60 inch tank to 80 pounds pressure in three minutes and to 160 pounds in 11 minutes. The cylinder is cast with cooling fins and air circulation is maintained by cooling fan on the flywheel. The pistons are long and carry five rings. The bearings are of bronze and the entire machine is heavily constructed.



In addition to the size above described, the manufacturers are building a compressor having a 3¼ inch bore and 4½ inch stroke. Operating at 200 revolutions per minute this size fills a tank 24x60 inches to 205 pounds per square inch in 30 minutes.

Manufactured by Toledo Gas Engine Works, Toledo, O. Price quoted at request.

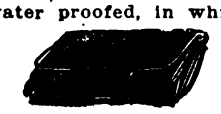
The Petry Cut-Out is designed on scientific lines and is placed in the exhaust line between the engine and the muffler. The



gas in passing through it is deflected over the valve to a very slight extent. This valve is so arranged that it does not obstruct the free passage of gas to any extent and when it is opened the gas is deflected through an opening to the air at a slight angle. When in this position it prevents the passage of gas to the muffler. A feature of this cut-out is the adjustable valve lever, which may be placed in any position in a circle; another feature is the removable side. The valve may be taken out without detaching the cut-out from the exhaust connections.

Manufactured by N. A. Petry Co., Inc., Philadelphia, Pa. Prices from $3.50 for 1½ inch size to $4.50 for 2½ inch size.

Duplex Folding Basket. Conservation of room is the first thought of the motor tourist who does not care to burden the machine with very many bulky articles. The illustration shows the Duplex Folding Handy Basket, which is made of brown canvas, water proofed, in which may be



carried liquids or solids equally well. It is reinforced with spring steel, rust proofed ribs and equipped with double handles and snap hooks for the covers. For campers, fishermen and auto picnics



they are ideal, as they may be compactly folded and stowed away under the seat.

Manufactured by the Planet Co., Westfield, Mass. Prices, $2 and $2.50.

Philbrin Ignition System. The Philbrin high frequency ignition system for Ford cars consists of three units—a distributor, a non-vibrating coil and a switch. The distributor is attached to the timer shaft, taking the place of the present timer, and being mounted in an upright position brings this unit out of the oil and grease. The coil, a new non-vibrating type, com-



pact in size, heat and moisture proof and with no moving parts, is contained in a molded case. The switch is of the selective type, permitting the use of two current sources, the Ford magneto or batteries. The system comes complete with thief proof locking device and all necessary brackets for mounting on the engine.

Manufactured by Philips-Brinton Co., Kennett Square, Pa. Price, $27.50.

Vietrolene is a scientifically compounded cleaner and polisher for automobiles. The manufacturers claim that it will remove all tar and road oil and restore the finish of the car to its original luster; also that

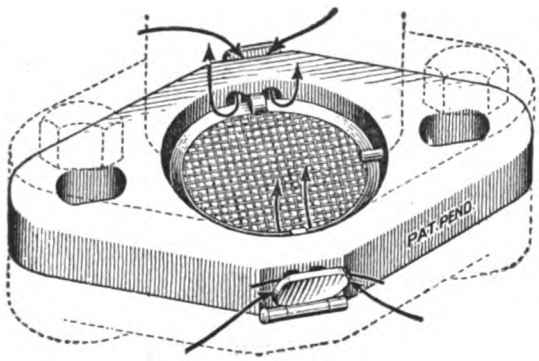


it will remove any rust that is on the nickel parts of the car. It may also be used to clean the leather upholstery and keep it soft and pliable.

Manufactured by Victrolene Co., 39 Pearl St., Boston. Prices from 25 cents for half pint can to $3 for one gallon can.

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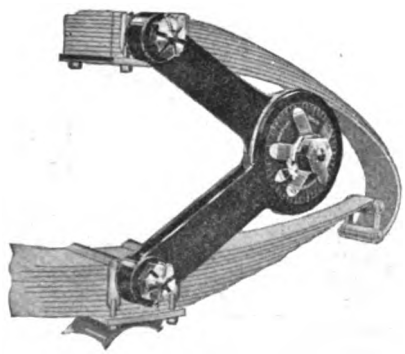
York Carburetor Perfector. It has been scientifically proved that but a small percentage of the gasoline put into the tank is converted into useful power. The problem of a more efficient engine is troubling the engineers at the present time. The manufacturers of the York Carburetor Perfector claim a great saving in gasoline, and an increase of power when this device is used. The York Carburetor Perfector is fitted to the joint between the carburetor and intake manifold, and has a screen incorporated which is designed to



break up the gasoline particles. The rapid passage of gas causes two little valves to open in the sides of the device, admitting air, which is in proportion to the speed of the engine. As the engine is slowed down the gas passing through the manifold does not have such speed and, therefore, the valves are allowed to close.

Manufactured by York Carburetor and Auto Accessories Co., Inc., 680 Woodward Ave., Detroit, Mich. Price quoted at request.

Hartford Shock Absorber. One of the features of the Hartford exhibit at the New York show was the demonstrations of the Hartford Shock Absorbers to prove

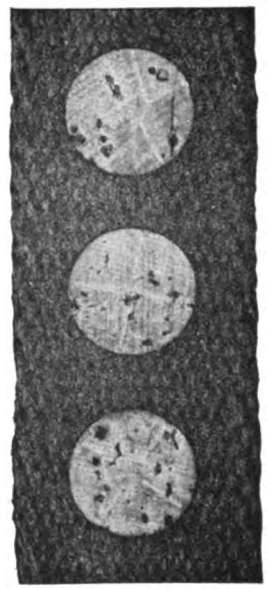


that they absorb all road shocks, prevent side sway, vibration and jolting, eliminate the possibility of spring breakage and insure longer life for the car and its equipment, not to mention the increased comfort to passengers. These absorbers, which are made in six sizes, from the kind for the lightest of cars to the heaviest, are of the well known racing type that has been standard equipment on all speedway racing cars during the past season. Each Hartford set, consisting of four absorbers, is complete and ready to attach when received, and they are accompanied by detailed instructions for the work of installation. They are sold under the standard Hartford guarantee, which reads: "Money back if not satisfactory."

The manufacturer has planned an unusually wide and thorough going advertising campaign for 1917, which will result in benefit to those who handle his products.

Made by the Edward V. Hartford, Inc., formerly the Hartford Suspension Co., 147 Morgan St., Jersey City, N. J. Price quoted at request.

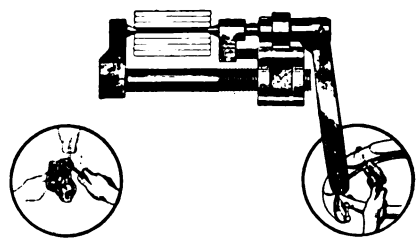
Cork Transmission Lining. At the present time cork is being used extensively in automobile manufacture. Its resiliency,



liquid repellant and frictional properties make it a very acceptable and useful product. The latest use is as an insert for transmission lining. This product is sold as a lining for the Ford car transmission bands. The base of the lining is formed of special imported fabric in which circular pieces of cork are inserted at intervals. The surface of the cork extends above the face of the lining to a very slight extent, so that the initial engagement with the transmission drums is made on the cork, the load being taken up by the fabric lining as soon as continued pressure compresses the inserts to its level.

Manufactured by the Advance Automobile Accessories Corp., 56 E. Randolph St., Chicago, Ill. Prices upon request.

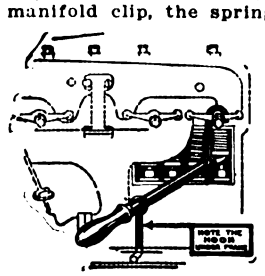
The Weise Leaf Spring Spreader when adjusted to the springs requires but one simple operation of the lever, which is rotable and can be worked or operated at any angle, spreading the springs apart and locking itself into this position,



whereupon the springs may be sufficiently lubricated. It can be operated on springs varying from 1½ to 2¾ inches wide, all parts being interchangeable and practically indestructible.

Marketed by A. F. Weise, 133 W. Washington St., Chicago, Ill. Price quoted at request.

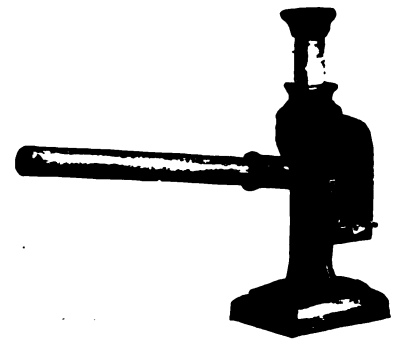
Valve and Tire Tool. One of the many uses of this combination tool are shown in the illustration. For removing valve springs, etc., one of the hooks is placed over the manifold clip, the spring raised



by the lever, which is hooked to the frame by the other catch, as shown. The valve spring may be left supported by the tool until the valve is replaced. This device may also be used as a tire tool. The end of the lever is inserted under the tire bead, the shoe pried over and the lever hooked to a spoke, thus giving an open point upon which to work.

Manufactured by King Specialty Manufacturing Co., Brookline, Mass. Price, 75 cents.

Hartford Auto Jack. Absolute reliability is essential for every automobile jack, and such is claimed for the Hartford Auto



Jack, which is constructed by skilled workmen. The gears are turned from solid steel and are encased in a malleable iron housing with a broad, firm base. The gear ratio, together with the long handle and short stroke, admits the easy lifting of great weights. It is claimed that a pressure of 15 pounds on the handle develops 1000 pounds of lifting power on the rack; sufficient force to lift the largest car with ease. This jack is finished in black enamel and is a practical equipment for any car, light or heavy.

Manufactured by the Edward V. Hartford, Inc., 147 Morgan St., Jersey City, N. J. Price quoted at request.

Lighting System. The dealers' display stand shown in the illustration is intended as a demonstration board for Genolite, Dynolite and Constolite, three lighting systems. The board with all necessary



brackets and attachments is furnished at same price as regular equipment and can be dismantled at any time and the systems installed upon a car.

Genolite system type C consists of a generator, a storage battery, two electric side lamps, electric tail lamp, headlight light control, operated from switch on steering post, with all wiring and connections. Type D has in addition to the equipment of C a windshield spotlight.

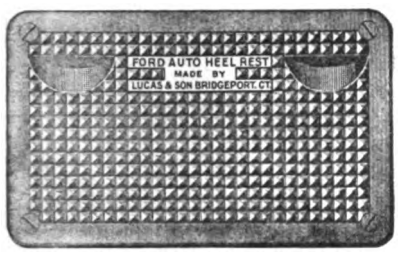
Dynolite consists of windshield spotlight with regulator, switch and wiring, and designed to attach to the Ford car magneto.

Constolite consists of bulbs for headlights, regulator, dimming switch and wiring, and is designed to be attached to the Ford car magneto.

Made by the Detroit Starter Co., Detroit, Mich. Retail price of type C Genolite, $29.85; Type D, $31.85; Dynolite, $6.85; Constolite, $4.85.

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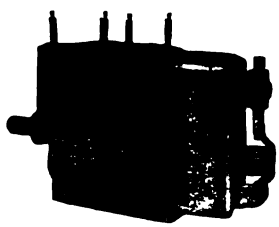
Auto Heel Rest for Fords. This is a simple device intended to relieve the driver of the strain that customarily results from holding the foot on the clutch and brake pedals for any length of time. It is made of frosted aluminum with a ⅜-inch pol-

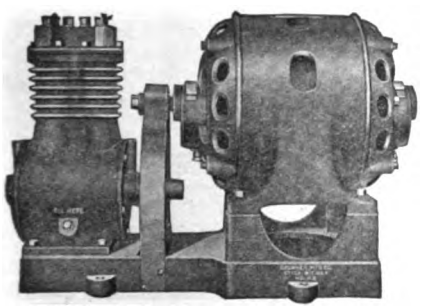


ished band. Furthermore, such a device protects the rubber mat on the driver's compartment of a Ford car from being quickly worn out by pressure and friction of a shoe heel. The pyramids and raised letters on the rests are cast solid and will not flatten or wear through, nor rust or tarnish. The rests are made ½, 1, 1½ and 2 inches high and are supplied for all makes of cars.

Made by J. L. Lucas & Son, Bridgeport, Conn. Sold at retail at $1 each.

Air Pressure Controller. The new model M automatic air pressure controller, which has just been put on the market, is designed to automatically start and stop the motor operating an air compressor, thereby relieving the garageman of the trouble of watching the air gauge and starting and stopping the motor by hand. This controller will operate successfully on alternating current motors up to and including five horsepower and on direct current motors up to and including one-half horsepower. It is intended for use in connection with the No. 42 motor driven air com-





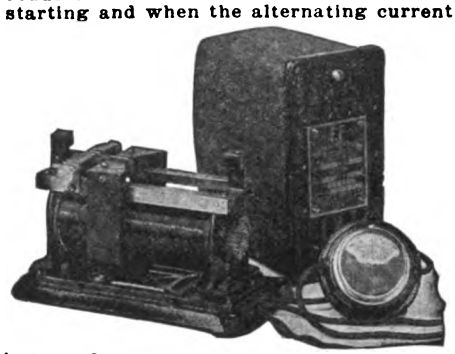
pressor, a cut of which is shown herewith, and as this air compressor is driven by a one-half horsepower direct or alternating current motor, it will work successfully with the model M automatic controller.

It is not a very hard matter to figure out how one of these automatic controllers will more than pay for itself in a very short time, as the only attention necessary is an occasional oiling of the motor, and the controller will insure a constant air supply at the right pressure without any attention whatever when once properly installed.

Manufactured by the Brunner Manufacturing Co., Utica, N. Y. Price quoted at request.

F-F Battery Booster. The F-F battery charging device is a magnetic rectifier for use on alternating current from any lamp socket of 60 cycles at voltages of 110, 220 or 20 per cent. higher or lower than normal and with a variation in frequency of 10 per cent., according to type of charger used.

A special transformer reduces the line voltage to the proper charging voltage without wasteful resistance. The change from alternating current to direct is accomplished through the use of copper and carbon electrodes actuated magnetically. By utilizing the negative, as well as the positive, alternations of the current, the full wave of alternating current is changed into a steady unidirectional current for charging batteries. A discharged storage battery can be recharged at a very high rate during the first several hours of charging, but should be reduced near the finish. This action is accomplished by the F-F Battery Booster, as, near the finish of a charge, when the voltage of the battery rises, the charging rate is automatically reduced to conform. The device is self-starting and when the alternating current



is turned off or stops for any reason, the battery is cut out and cannot discharge through the rectifier. This action makes night charging practical. When desired two or more rectifiers can be connected in series or multiple on the secondary or load side to get various voltages and amperages.

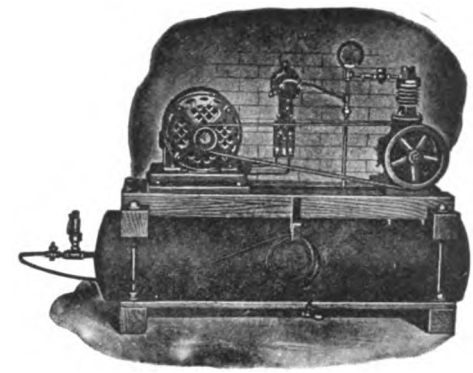
Manufactured by the France Manufacturing Co., Cleveland, O. Price, $15 complete.

Portable Benches. Since the repair shop in most garages is in a different section of the shop than the section in which the cars are stored, much time may be saved that is frequently spent by the repair man in going back and forth from the car to the shop for tools, and to do bench work. The illustration shows what is termed the quick action portable bench No. 1. It is designed to be wheeled to the car. The general construction of the bench is plainly seen from the cut. It is light, strong and rigid, easily steered by the roller bearing castors while being moved. The top is solid oak, the legs and upper cross pieces are steel angles. The lower cross pieces, as well as the wheels, are cast iron. By a special device the stand may be locked in standing position. With the exception of the vise the bench is equipped as shown.



Manufactured by the United Engine and Manufacturing Co., Hanover, Pa. Price quoted at request.

Free Air Unit. It is pretty generally conceded that the free air service is an attraction for any garage, whether large or small, and oftentimes such service brings steady customers. The Gardner automatic free air unit consists of a two by 2½ air cooled, splash lubricated air pump, bolted to a ½ horsepower electric motor and mounted on an oak frame. An endless belt is used and the motor is mounted on a sliding base for the purpose of taking up any slack in the belt that may be caused from use.



The frame is very securely bolted around the air tank and designed to prevent the danger of warping. An automatic controlling device, mounted between the pump and motor, starts and stops the motor automatically as the pressure falls and rises in the receiver. With the unit may be furnished all necessary connections and gauges complete for installation. The motor can be furnished to operate on either alternating 60 cycle single phase or direct current.

Manufactured by the Gardner Governor Co., 126 Williamson St., Quincy, Ill. Price quoted at request.

Singer Auto Traffic Signal. It is an interesting study to note the various signals adopted by automobilists in congested traffic conditions. No two methods seem to be alike. A hand thrust forth from the driver's side may denote, stop, turn to the left or turn to the right. Doubtless many accidents would be averted if a universal signaling system were adopted.



The Singer Auto Traffic Signal, which is now being manufactured, is designed to prevent traffic confusion and provide a suitable signal which is positive in action and easily interpreted.

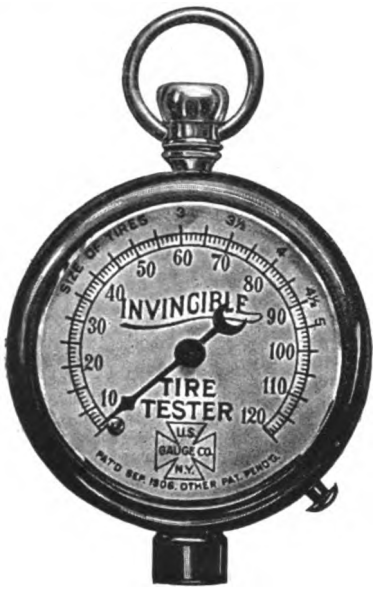
This device consists of two electrically lighted boxes, one at the front of the car, the other at the rear, in which are carried five signs, Ahead, Right, Left, Stop and Back. These signs are controlled by a circular switchboard located on the steering column directly beneath the wheel.

When the driver of the car wishes to stop he simply presses the stop button and the signal Stop appears in both boxes. This same signal is automatically displayed upon application of the service brake. The other signals are operated in like manner and as all of the buttons are interlocking, but one signal can be displayed at one time.

Manufactured by Singer Auto Traffic Signal Co., 2827 Locust St., St. Louis, Mo. Price quoted at request.

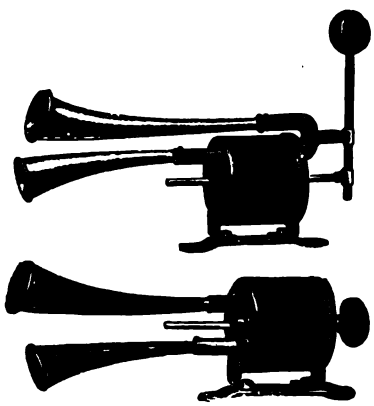
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The Invincible Tire Pressure Tester is an ingenious device, which may be carried in the vest pocket like a watch or in a tin box, which is furnished, in the tool box. The crystal is made of so-called unbreakable composition, which is transparent. The dial is graduated to indicate from zero to 120 pounds pressure. In addition to the pounds pressure marking, a second series of numbers indicates the pressures required for different sized tires.



Manufactured by United States Gauge Co., New York, N. Y. Price, $1.50.

Warnola Warning Signal. A horn with a distinctive note that does not alarm, yet serves as a warning signal, is illustrated herewith. This device is built to satisfy the demand for a different warning, something that would be effective in the city where everyone was accustomed to ordinary horns, and also in the country where the note must be far reaching. No diaphragms or springs are used in the horn, the note being produced by the rush of air from a piston working in a double end cylinder through reeds. Short, sharp blasts may be given by a quick movement, or a long distance covering signal produced by a slower plunge of the piston. The device is made in two styles, Nos. 1 and 2.



Manufactured by Warnola Manufacturing Co., 73 Wooster St., New York. Price for No. 1, $7.50; No. 2, $5.

The Wayne Pump solves a problem that has been uppermost in the minds of pump and tank manufacturers for 25 years—that of a continuous flow self-measuring pump. The pump stands nine feet, two inches over all and has a base diameter of 18 inches. The housing is cylindrical in form, the upper part of which slides up and down on counter-balanced weights, much like a window. This arrangement does away with the necessity of extra space at the curb, which is always necessary where



hinged doors are employed. This makes the pump weatherproof, eliminating all danger of damage to the mechanism and making it impossible for the pump to be operated by an unauthorized person.

This is a plunger pump—not a rotary pump—which has two reciprocating plungers so operated that the combined displacement is constant. Adjustments of the plunger stroke are very simple and minutely accurate. A simple adjustment makes it possible to secure any exact unit of liquid. All bearings are large and automatically oiled. No crossheads are used. The usual form of stuffing boxes are found—there being two in number. Two recording devices are attached to the pump—one 1,000,000-gallon meter and an eight-inch predetermining counter is attached to the front of the pump. This enables the operator to obtain any quantity from one quart to 20 gallons, and repeat if necessary. Both of these devices are driven in a positive manner, making it impossible for the pump operator to obtain even the smallest part of a gallon from the pump without an accurate record of the transaction appearing on the recording devices.

The standard finish of the pump is orange enamel lettered in gold bronze.

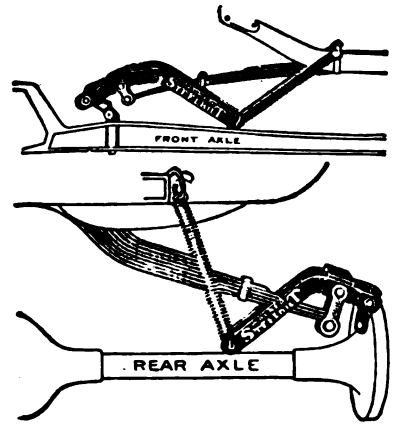
Manufactured by the Wayne Oil Tank and Pump Co., Fort Wayne, Ind. Price quoted at request.

The Weaver Universal Tire Changer is designed for the rapid changing or mounting of tires. It reduces to a minimum the time for changing quick detachable rim tires, split rim mountings or clincher tires. The changing operation is entirely mechanical and the device is so arranged that little effort is required. The manufacturers claim that there is no damage to tire hazard present since all the pressure is brought upon the tire by means of roller contact.



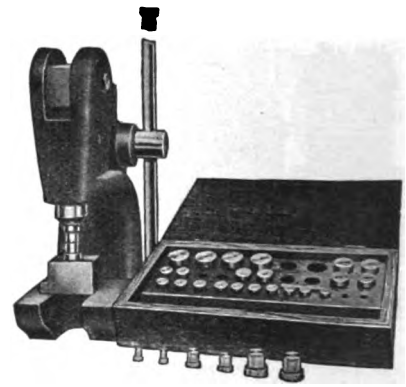
Manufactured by Weaver Manufacturing Co., Springfield, Ill. Price quoted at request.

The Walker Steelbilt Shock Absorbers for Fords smooth out rough going—soak up the shocks and cradle the Ford in a big, easy car sway, the makers claim. They are built entirely of steel with the springs extra long, oil tempered and of the utmost durability. The spring bolts are turned from cold rolled steel and hardened—equipped with oilers. The free, unhampered action given to both the coils and springs require no sliding parts and they are thoroughly safe and as strong as steel can be in every section.



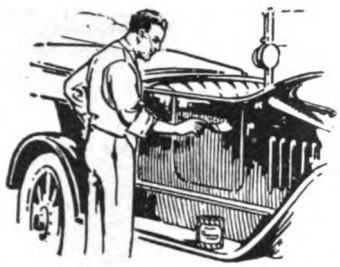
Manufactured by the Walker Manufacturing Co., 31 Hamilton St., Racine, Wis. Price, $7.50 per pair.

Beach Bushing Press. It is safe to say that nearly one-fifth of the expense and labor in overhauling an automobile goes into the repair or replacement of the bushings. The Beach process bushing press outfit consists of a small press having a 30-ton pressure capacity, and a set of swedges in all sizes from 7/16 to 1 3/16 inch, an outfit which will handle practically all the bushings now in use. The operation of the press is simple and in most cases it is unnecessary to remove the bushing from the piece. The proper size swedges are placed in the bushing, the bushing then placed in the press and pressure applied. All that then remains to be done is to ream out the bushing to fit. The press saves the outlay for a stock of metal or cored bushing material, as in most cases the old bushings may be used over again. It is claimed that bearings last longer after this treatment because of the harder and closer grain imparted to the metal by the extreme pressure of swedging.



Marketed by the Greb Co., 202 State St., Boston, Mass. Price quoted at request.

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The Panvar Car Refinisher is a lasting liquid luster that can be handled with excellent results by the amateur. It dries over night and is quickly applied, is self-leveling (which means that it will dry out evenly and not show brush marks), dries with a hard, glossy finish, and being transparent can be used on any colored car, seats, tops and plated parts. Luster will last as long as varnish, and the makers claim will not crack, creep, peel or turn white from the effects of water or steam. Sells for $1.50 a quart. A quart will do a car.

The Panvar Co., 618 Bulletin Building, Philadelphia, Pa. $12 per dozen. (1 case.)

The Motor Driven Visible Measure Gasoline Dispenser is designed to eliminate the incidental losses in the vending of gasoline. The accompanying illustration shows the general appearance of the apparatus opened up to show the mechanism. The pump is driven by a Westinghouse one-quarter horsepower motor, entirely enclosed in the base in accordance with the rules of the National Board of Underwriters. The Brady dispenser visibly delivers a full gallon for every gallon ordered. When the wagon delivers



gasoline to the garage the tank gauge shows accurately the full quantity obtained. Every gallon drawn from the tank into the disoenser is shown on the tank register, which can be checked with the tank gauge. Thus both the public and the garage owner are protected from loss. Furthermore, the oil companies are enabled to make more rapid deliveries than by measuring cans from wagons to garage tank where the Brady dispenser is installed.

Manufactured by the Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa. Price quoted at request.

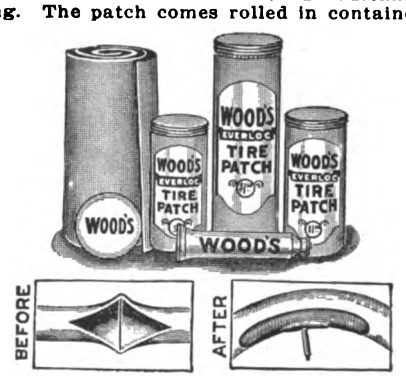
The Akron-Williams Tire Rebuilding Stand is designed for the tire repair shop, used on retread jobs and major sectional repairs. It is similar to stands used for hand operation in tire factories. Unlike the latter, however, it takes up a minimum of floor space and is much lighter



in weight without sacrificing convenience or strength. A new feature is the spring ratchet attachment, which permits the tire being turned either way at will, or being locked rigidly in any desired position.

Manufactured by the Williams Foundry and Machine Co., Akron, O. Price, $30.

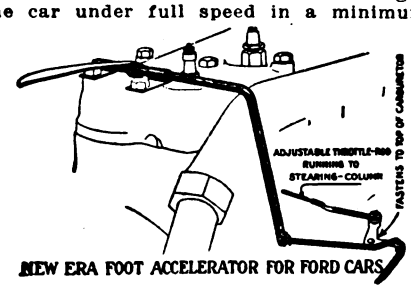
Wood's "Everloc" makes a permanent repair on the smallest puncture or largest blow out on tubes without vulcanizing. The patch comes rolled in container,



with tube of cement complete, and the makers claim a permanent job on any puncture from anail hole to a cut or blow out 17 inches in length, which can be applied in five minutes.

Manufactured by W. C. Wood, 74 Western Ave., Minneapolis, Minn. The $1.50 patch is made in sheets 6½x18½ inches, $1 patch 4 1/16x18 inches, 50 cent patch 2x16½ inches, and can be cut to any size desired. Large sheets will repair 100 one inch cuts or 250 nail punctures.

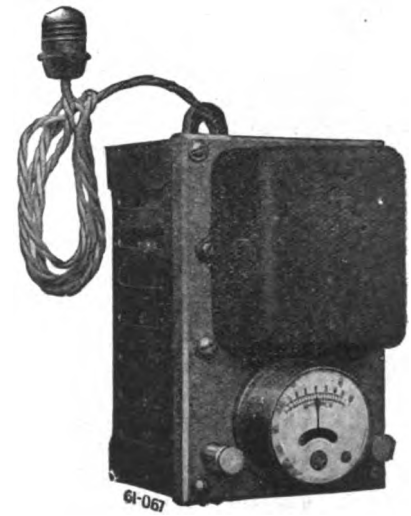
The New Era Foot Accelerator can be attached to any Ford car in a few minutes. There are no holes to drill nor is any machine work needed. It furnishes a perfect foot control and enables the driver to get the car under full speed in a minimum



NEW ERA FOOT ACCELERATOR FOR FORD CARS

amount of time, and leaves his hands free to operate the steering wheel, or horn.

Manufactured by New Era Spring and Specialty Co., 717 Mather St., Chicago, Ill. Price complete, $1.



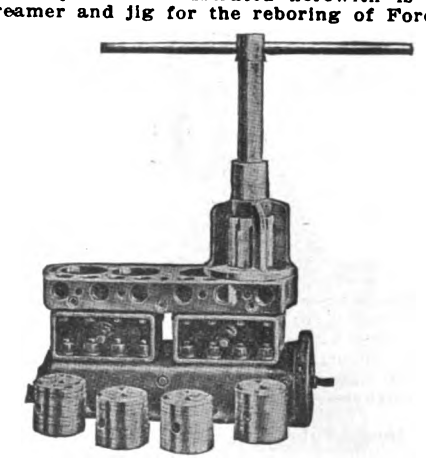
The Wagner Rectifier. Because of unusual driving conditions the using of starter and lights for long periods, many motorists find it necessary to have the battery charged from an outside source of current from time to time.

It is not always convenient to visit a battery station and should it be necessary to leave the battery for some time the owner is often without the use of the starter and lights, or possibly even the car itself.

The Wagner Rectifier is a device for home charging from alternating current and is of the well known vibrating type, simple and entirely mechanical. With it the alternating house current may be used, the battery connected and left. The manufacturers claim that with the Wagner Rectifier it is impossible to connect the battery up wrongly and that once started it requires no further attention until the battery is fully charged. The device is designed to give a tapering charge so that an overcharge is impossible.

Manufactured by Wagner Electric Manufacturing Co., St. Louis, Mo. Price quoted at request.

Cylinder Reamer and Jig. There is a constant call on repair shops for the reboring of cylinders. As the efficiency of any engine is greatly impaired by scores, or cylinders that have been worn out of round, practically the only repair in many cases is the reboring of the cylinders and replacement of the old pistons with oversized pistons. Illustrated herewith is a reamer and jig for the reboring of Ford,

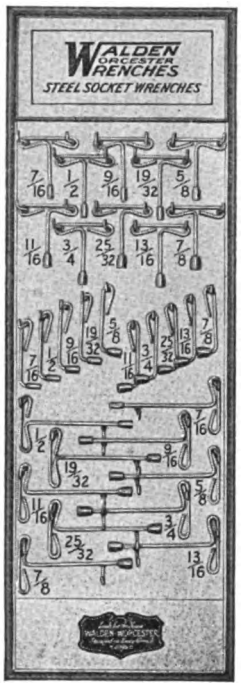


Metz and Buick 3¾ inch cylinders 1/32 inch oversize. This reamer is fitted with inserted tool steel blades designed to cut on the end of the blade. The tool centers itself and the jig will square the reamer, thus giving a perfect bore. It is said that owing to the simplicity of operation and because of the centering feature it does not require experienced labor to operate it.

Manufactured by the G. H. Dyer Co., Cambridge, Mass. Price quoted at request.

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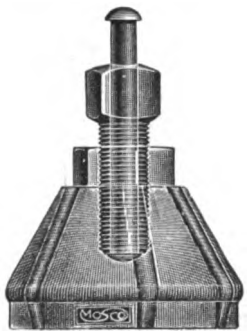
Wrench Display Set. The display and stock set of offset and tee handle wrenches illustrated, is designed to be used as a silent, ever-working salesman in the supply station. An essential point on all wire handle wrenches is the method of attaching the socket to the wire so that it can-



not work loose or turn. The Walden Worcester wrenches are made by special method. The wire handles are milled and driven into the oval shaped broached hole in the socket, making it impossible for the handles to turn or work loose. All sockets are made of steel, from a solid bar, and broached accurately to size. They are shaped to allow a maximum of clearance in use, but with full allowance of stock for proper strength.

Manufactured by Walden-Worcester, Inc., Worcester, Mass. Price quoted at request.

The Mosco Floating Plunger Wheel Puller is made to fit 172 models of 32 popular cars. The special feature of this puller is the floating plunger, which slides in the



pressure screw. When the wheel is stuck or frozen to an axle a tap of the hammer on the head of the plunger will generally loosen the wheel.

Manufactured by Motor Specialties Co., Waltham, Mass. Price quoted at request.

Inner Tube Case. There are a number of important factors to be considered in the preservation of spare inner tubes that the average motorist is prone to forget. The life of rubber is materially shortened by exposure to light, moisture to a certain degree, oil or gasoline. Tubes thrown carelessly into a tool box depreciate very rapidly and are often rendered worthless by frictional contact with sharp edged and pointed tools. The Martin Inner Tube Cases, which are made for either one or two tubes, are of water proof enameled



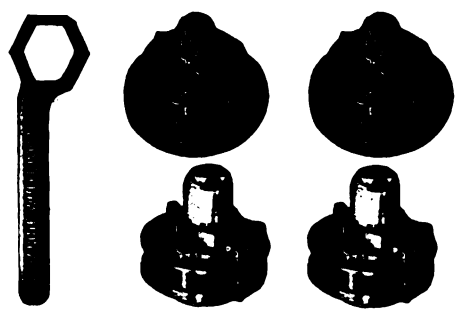
cloth and offer protection against light as well as abrasion. They offer a practical solution to the exposure problem and pay for themselves by preserving tubes and saving the patience of the autoist.

Manufactured by the Martin Manufacturing Co., Lancaster, Pa. Price for single tube case, 35 cents; double case, 50 cents.

The Minute Demountable Wheel is, as its name implies, designed to afford instant change of Ford wheels on the road when tire troubles develop, obviating the necessity of struggling with the tire. The wheel is taken off by simply unscrewing one nut, and it can be replaced just as easily, the maker claiming either opera-



tion can be done in 60 seconds. The Minute Wheel equipment requires that the four special hubs sold with the wheel be fitted upon the regular Ford hubs, which gives increased strength to the assembly. The Ford wheels are used and the flange part of the new hubs is bolted to this with its powerful driving lug bolts. The two units lock together with the exactness and more than the strength of one piece. As the nut goes on with a left hand thread, it is impossible for it to come off, even

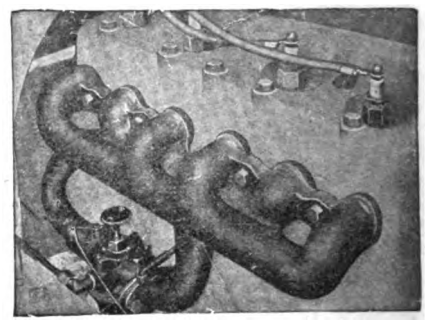


though the locking plate, which is provided, should not be used.

Made by the Hill-Smith Metal Goods Co., 86 Pearl St., Boston, Mass. Retail price for complete equipment for four wheels, $30.

The Vaporator. Every motorist is interested in the reduction of fuel cost, and it would seem that the only practical solution of this problem at the present time is to use kerosene or coal oil for fuel, rather than the more expensive gasoline.

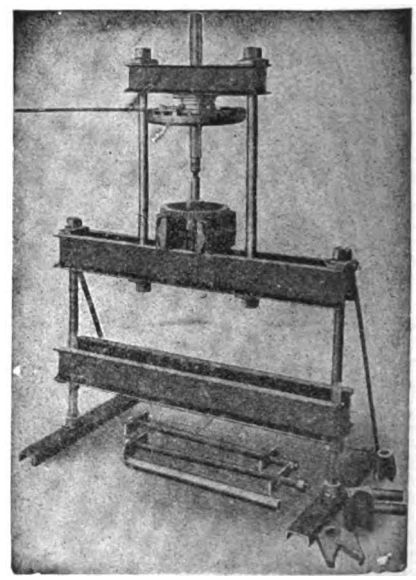
The Vaporator, the makers say, is a



practical and efficient device for the utilization of coal oil as a fuel. Not only a reduction in fuel cost is claimed, but also an increase in mileage per gallon. This device combines an exhaust and intake manifold, to which is attached the standard Ford carburetor. Attached to the front of the seat and connected with the manifold is an auxiliary gasoline tank holding 1 1/2 gallons. The gasoline is used simply for starting, after the engine has heated up this fuel is shut off and the engine continues to run on kerosene, which is held in the main tank. The full equipment comes ready to attach and requires no special fitting or boring of holes.

Manufactured by the Vaporator Manufacturing Co., 2737 Washington Ave., St. Louis, Mo. Price, $16.50.

The Manley 22-Ton Universal Auto Press has a high power leverage, starting at 200-1 and automatically increasing at the end of stroke to 5000-1. This is obtained by the lever fitting into the socket on ratchet block. The paul uses the same notches in hand wheel and tremendous pressure is obtained on the screw with little effort. An important feature of this press is that the screw being exposed at the top may be

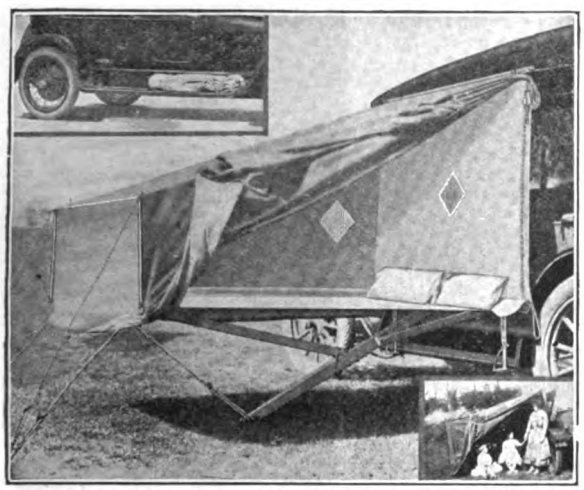


struck a sharp blow in obstinate cases, such as a rusted shaft, which pressure alone will not move. With maximum pressure the jar of the blow does the rest. No damage to the press will result, as it is designed to withstand such a blow.

The low power press (1000-1) leverage is 10 times quicker than a ratchet.

Manufactured by the United Engine and Manufacturing Co. Price complete, $66. Write for literature.

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Whittmann Motor Camps, when packed are only four feet six inches long and six inches in diameter. They strap to the running board of the car and the duffle which incloses it permits room also for the stowing of blankets, etc. It is but the work of a moment to unroll it, fasten one end to the running board, set up its one leg, peg down the guy ropes and fasten the peak of the tent over the car. The tent is then ready for the night and the double bed, which is 4½ feet wide by six feet three inches long, is as comfortable as a mattress. The camp walls are joined and overlapping with a screened port on each side, adjustable from within to admit the breeze, but so designed as to exclude rain and insects. These camps are made for two, four, six or eight people, with separate rooms for each two. The dimensions of each room are six feet eight inches long by four feet six inches wide. The bed tension is automatically self-adjusting to weight and sags less the more weight is put upon it. The tent is made of waterproof balloon silk and the entire equipment, including tent, bed and carrying case, weighs 15 pounds per person.

Manufactured by J. H. Whittman Manufacturing Co., Kansas City, Mo. Price quoted at request.

The Johnson Electric Grinding and Buffing Tool is operated by a self-enclosed motor, with all its working parts enclosed



in a dirt proof casing. The motor may be had in a number of windings at speeds of either 1800 or 3600 revolutions per minute. For garage work the arbors may be fitted with two grades of emery wheels; for tire vulcanizers a buffer and grinding wheel. The manufacturers claim the machine is pleasing in appearance, both easy running and silent in operation. The illustration shows the machine upon a standard mounting, but the grinder unit may be purchased or used separately.

Manufactured by the U. S. Electrical Manufacturing Co., 459 E. Third St., Los Angeles, Cal. Price quoted at request.

Buffington Folding Chair. The illustration shows a folding chair that weighs only nine pounds and can be folded into a space three inches thick. Such a seat is



especially adaptable to small cars when an extra passenger is to be carried. The seat comes finished in Japan and may be had in a number of sizes.

Manufactured by C. A. Buffington & Co., Berkshire, N. Y. Price quoted at request.

The Tell-Tale Piston Ring is made of a metal which is capable of withstanding a great heat without losing its tension. Each ring is individually cast and retains its scale or resilient strength when finished. The wearing edge is turned and so adapts itself to the cylinder in which it slides. Around the outside is turned a shallow



groove or wiping chamber, which is designed to collect any surplus oil and allow it to escape into the crank case through vertical channels cut to the groove at intervals. The joint is of the familiar square lap type, in effect two rings but only one casting.

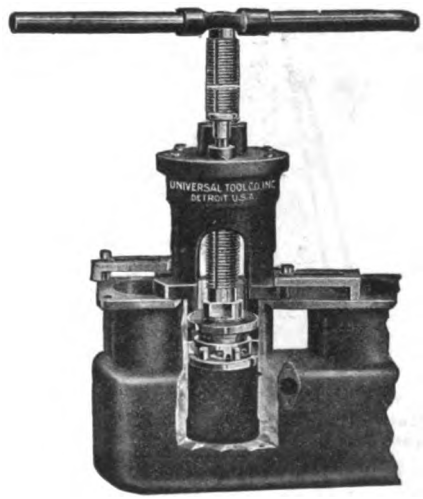
Manufactured by Vulcan Machine and Tool Co., St. Louis, Mo. Price quoted at request.



Dixon Counter Display. A new and attractive counter display is being sent out by the Joseph Dixon Crucible Co. to enable the dealers to sell more of Dixon's lubricants. The rack is of metal and enameled in red and black. On the back, for use by the dealers and salesmen, is a chart showing the various uses of the different kinds of lubricants. On the front are spaces for displaying booklets and glass jars containing samples of the lubricants.

All dealers that may be interested in obtaining one of these racks are requested to write to the Joseph Dixon Crucible Co. of Jersey City, N. J., Dept. H.

The Universal Cylinder Reboring Tool is simple in design and effective in action. The cutter head has six cutter surfaces that are adjustable in unison. A bevel expansion ring is fitted into the cylinder which is to be rebored and the bevel pilot head acts as a centralizing device. There is also an oversized securing ring, which follows the new cut, thus insuring an absolute rigid tool and perfect central device. This tool is intended to be used either by hand or under a drill press and on detachable head cylinders the reboring can be done without removing the cylinder block from the car. The operator can set the cutters at any desired size within one-half of one-thousandth of an inch, enabling him to rebore the cylinder in one

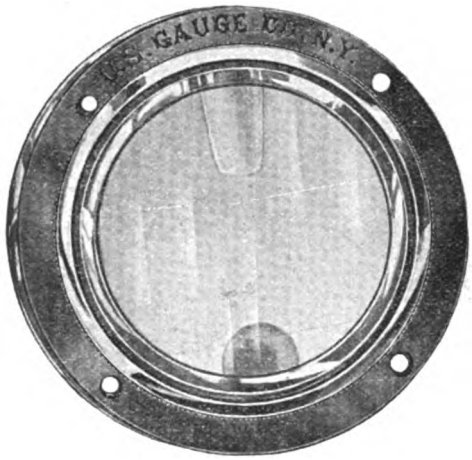


operation to fit pistons already made regardless of the oversize of the pistons. The value of this tool in a service station or repair shop is largely in that it is available at any time without power and the adjustments for work can be made without chance of error.

Manufactured by the Universal Tool Co., Detroit, Mich. Price quoted at request.

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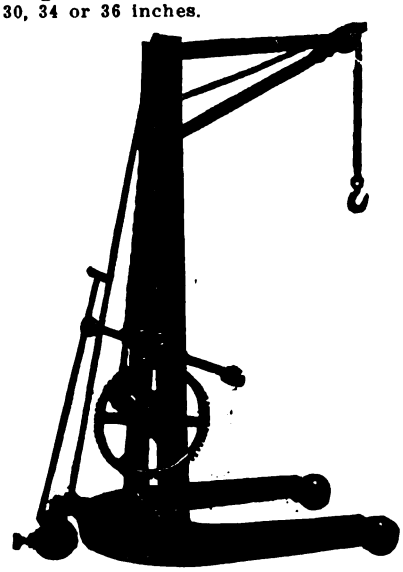
The U. S. Dash Board Sight Feed Oil Gauge shown in the accompanying cut has a heavy cast case and ring. The flanges are cast solid to the front part of the case, permitting it to be mounted practically flush on the dash. The interior of the case is finished in white enamel. This



gauge matches in sizes, shape and finish the company's 1913 design automobile pressure gauges and can be mounted with the other, retaining a uniform and elegant finish on the dash. They have standard connections, ⅛ inch female pipe thread on the inlet and ¼ inch on the outlet.

Manufactured by United States Gauge Co., 67 Wall St., New York City. Price with two-inch dial finished in brass, $4; nickel finish, $4.60.

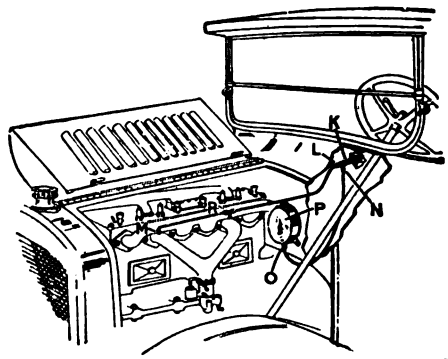
The Portable Floor Crane has many uses and the saving of time accomplished by its employment makes it almost invaluable where much automobile or machine work is done. The crane illustrated is made of steel with a cast iron base. Standard cranes are made in a number of sizes and have capacities ranging from one to two tons, with lifts from 6½ to 9½ feet according to size. The length of overhang is 30, 34 or 36 inches.



Manufactured by the United Engine and Manufacturing Co., Hanover, Pa. Price quoted at request.

Imperial Primer. A device which is claimed by the manufacturers to do away with all starting troubles due to excessive and low temperatures, is known to the trade as the Imperial Primer. This device is designed for practically any car and consists of an auxiliary or priming tank S, in which is carried a supply of high test gasoline, a priming pump K, which is connected with the manifold at one or more points.

One stroke of the pump plunger is said



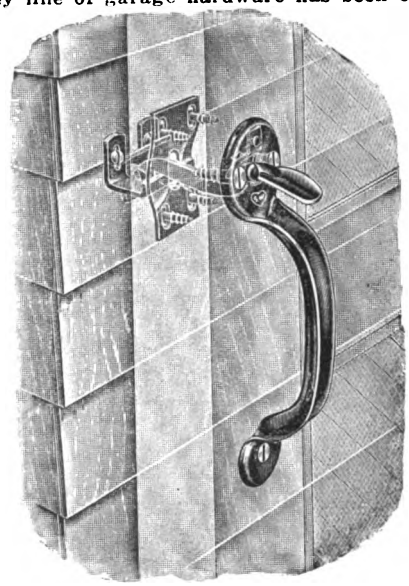
to force a finely atomized spray of fuel into the manifold, which furnishes the necessary vapor for th first two or three explosions; after which the engine is warmed enough to vaporize the fuel from the carburetor.

All tube connections are made by means of compression couplings, so that soldering, flaring, etc., are eliminated. The only change required in the engine is the boring and tapping of the ⅛ inch holes in the manifold.

Though the best results are obtained when high test gasoline is used in the priming tank, low test gasoline may be used with satisfactory results.

Manufactured by the Imperial Brass Manufacturing Co., 517 S. Racine Ave., Chicago, Ill. Price complete, $6.

Wrought Steel Back Catch. The Stanley line of garage hardware has been ex-

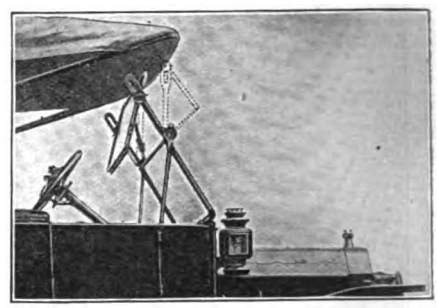


tended by the addition of a wrought steel back catch for 1¾-inch garage and barn doors. The catch holds the door firmly against the side of the building. Opening the door forces the stout hook over the catch plate, where it is held by the double leaf spring. Slight pressure on the thumb piece releases it. When the door is swung open its momentum is checked and absorbed by the escutcheon plate, which is struck up and takes the shock off the hook. The screw holes in the catch plate are slotted so that it can be adjusted to meet the bumper squarely. They are furnished in either Stanley japan or sherardized finishes.

Manufactured by the Stanley Works, New Britain, Conn. Price quoted at request.

Banker Windshield. Riding in the front seat of a Ford on a hot day, the discomfort due to the lack of circulation of fresh air, a rain storm makes it necessary often to put down the windshield on account of the inability to see the road ahead through the moisture accumulated on the glass, thereby subjecting the operator to the unpleasantness of getting wet.

The Banker Windshield was designed to overcome these conditions. This attachment will convert a standard Ford shield into one that may be easily and quickly adjusted to many different positions. It is simple to replace the present hinges with a Banker attachment. The same



screws and screw holes are used and the exchange can be made without even taking the windshield off the car. It can easily be done in a short time by anyone. The hinges are of the friction type and by a slight turn of the wing nuts the upper section of windshield can be adjusted to any position.

Manufactured by the Banker Windshield Co., Pittsburgh, Pa. Price, $1.50 per set.

Century Cigar Lighter. For the touring motorist there are few accessories quite so convenient as an electric cigar lighter. It makes no difference what speed the car is going or how brisk the wind is, such a device makes the lighting of a cigar an easy matter. The Century Cigar Lighter is made to operate on a six-volt storage



battery, it is neat in appearance, being finished in black leather with nickel trimmings. It is equipped with seven feet of silk cord, a push switch, and may be attached in a very few minutes.

Manufactured by Mabey's Electric and Manufacturing Co., Indianapolis, Ind. Price complete, $1.

The Dyer Lightweight Piston is designed to fill a want for a light yet strong piston for Ford cars by the owner who is remodeling his car. The piston is made of a specially tough metal carefully machined and has special oiling features. These pistons are made in standard and



oversizes and are sold complete with wristpins and rings. Each piston weighs 2¼ pounds, or one pound less than the Ford piston. In addition to the extreme light weight is the feature of uniform balance; each piston is limited to a variation of two ounces.

Manufactured by the G. H. Dyer Co., Cambridge, Mass. Price quoted at request.

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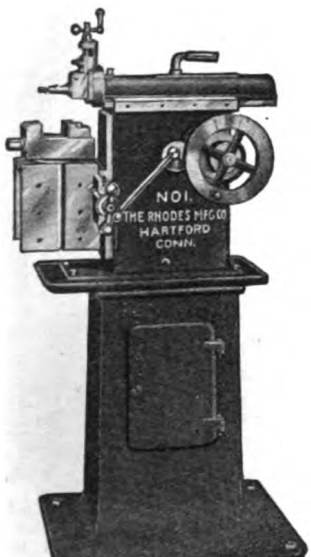


The Vaporspray is a scientifically designed apparatus for applying paint. The device is in effect a large air brush operating from pressure from 10 to 100 pounds. It is simple, for it has absolutely no adjustments to be made. The size of the spray is regulated by pressure exerted on the thumb button. The further the button is pressed the faster the fluid will flow. Another feature is the fact that the reservoir is an ordinary Mason jar, which can be obtained at any hardware store, thus making it possible to use any number of jars which may contain various liquids. The equipment includes six feet of high pressure hose and connections.

Made by Vapor-Valve Co, 2820 N. Spring Ave., St. Louis, Mo. Price, $16.50.

Rhodes Horizontal Shaper. Next to the milling machine there is no machine tool that can be used for such a variety of small work as the shaper. With this tool many small jobs, such as planing, grooving, cutting keyways, etc., can be accomplished very quickly. The Rhodes Shaper illustrated is designed for small work and fitted with a sliding bed, upon which is mounted a revolving vise table. The cutting tool has a seven-inch stroke.

A particularly pleasing feature of this machine is that it may be converted into a 3½-inch vertical slotter, adjustable to 10



degrees, simply by removal of the traveling table and attachment of the vertical shaper arrangement.

The workmanship and materials entering into the construction of this machine are of the best. All parts are accurately machined and fitted.

Manufactured by the Rhodes Manufacturing Co., Hartford, Conn. Price quoted at request.

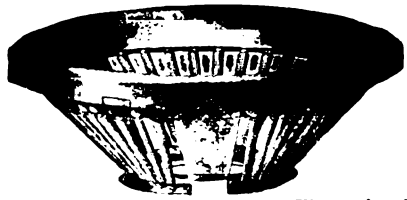
The Guarantee Visible Pump consists of two separate and distinct units, a measuring unit designed for use outside the garage or filling station and a pumping unit consisting of a rotary section pump, driven by an electric motor through a silent chain. The whole pumping unit being mounted on a cast iron base suitable for location in any convenient place. The container at the top of the pedestal is of glass protected by a guard of expanded metal and marked to measure from one to five gallons. Opening into this container and extending down through the pedestal is a one-inch stand pipe, which connects with the gasoline supply line. This stand pipe can be raised or lowered and set in a measuring stop so as to adjust the height of the open end inside the container to correspond with the gallon marks on the glass. The measuring is automatic, thus eliminating the human element and insur-



ing absolute accuracy. The pipe to the right of the container is a conduit which carries the wiring from both the motor and the light globe. The pipe to the left of the container is a vacuum line extending from the top of the container down through the pedestal and connecting to the exhaust end of the rotary pump. The small steel ball when raised closes the switch operating the motor and also operates the valve controlling the vacuum. The makers claim a guarantee of one year against defects and workmanship.

Manufactured by the Guarantee Liquid Measure Co., Pittsburgh, Pa. Price quoted at request.

Rofilo is an ingenious little device for the elimination of work in grinding valves. It consists of a steel frame carrying 24 small rolling files, set in the frame at the angle of the valve face. Rofilo is placed in the valve seat and the valve is replaced with its face resting upon the files in the cage. The valve is then revolved in one direction at high speed with an electric or hand drill. The files roll between the valve and seat faces and the cutting action results from the tendency of the files to adjust their single peripheral speed to the many peripheral speeds along the conical



face of the valve and seat. There is the same amount of slippage between the files and seat, with the result that the cutting action on both surfaces is simultaneous and equal, resulting in a smoothly cut or filed surface on both the valve and the seat, the two surfaces being parallel.

Distributed by the Rofilo Sales Co., 1317 L. C. Smith Building, Seattle, Wash. Price quoted at request.



Automobile Bucket. No automobilist can afford to be without some means of filling his radiator should it become dry. The illustration shows a handy bucket that will hold about one gallon of water, yet can be folded flat when empty and carried in the pocket. It is made of a special dull finished water proof duck and so designed that water can be poured from it into the filler of the radiator without the use of a funnel.

Manufactured by the Martin Manufacturing Co., Lancaster, O. Price, 50 cents.

The Midway Ford Special Magnetiser is a portable instrument for remagnetizing the magnets of a Ford magneto without disassembling the car and removing the magnets from the flywheel, and is operated with current from storage batteries, dry cells or through a resistance bank direct. It consumes only a small amount of current and is very simple to operate.



There is nothing to get out of order and the magneto or instrument cannot be injured by any mistake in using it. It is simple to remove the flywheel cover and hold the ends of the remagnetizer against the ends of the magnets and turn on the current until charged.

Manufactured by the Midway Mechanical Co., 1555 Selby Ave., St. Paul, Minn. Price quoted at request.

Dover Truck Funnel. Designed to meet the demand for a special heavy truck funnel in the garage, the Dover truck funnel deserves attention. This funnel is made of very heavy steel and galvanized. The

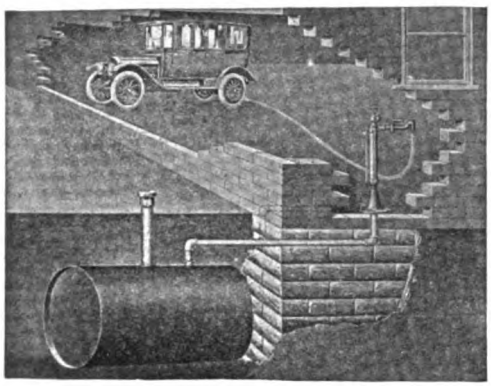


spout and lower part of the body is beaded so that it will not become air bound in any size opening. It is fitted with fine brass strainers and also with a hoop to hold chamois.

Manufactured by Dover Stamping and Manufacturing Co., Cambridge, Mass. Price for four quarts, $1.25; for eight quarts, $1.50.

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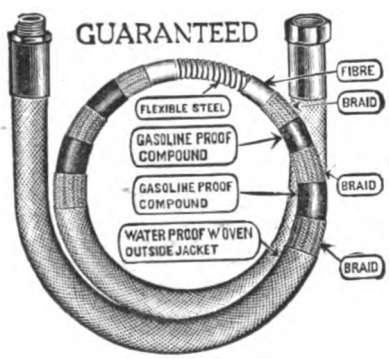
Gasoline Storage Outfit. Few garage owners realize that the storing of gasoline plays an important part in the performance of the car. If left exposed to air circulation a portion of the gasoline vaporizes, leaving the less volatile part. When this gasoline is used in the engine, starting is made difficult. Another argument for proper gasoline storage is the elimination of fire hazard from this source.



The Scaife Gasoline Storage Outfits are a practical system for storing gasoline. The tank may be placed outside the garage and below the surface of the ground, the filler and vent also outside, the pump connection through the side of the garage and the pump at any point inside the garage. The tanks are made from heavy galvanized iron, painted on the outside with rust proof paint. The heads and seams are welded to the shell, making the tank practically leak proof. Before leaving the factory each tank is subjected to a compressed air test. The filler pipe is fitted with cap and lock and designed to act both as strainer and vent. The pump faucet, cylinder and inside parts are made of brass, handle and foot plate of galvanized iron. Each pump is fitted with an anti-drip faucet, shut off and padlock.

Manufactured by Wm. B. Scaife & Sons Co., First National Bank Bldg., Pittsburgh, Pa. Price quoted at request.

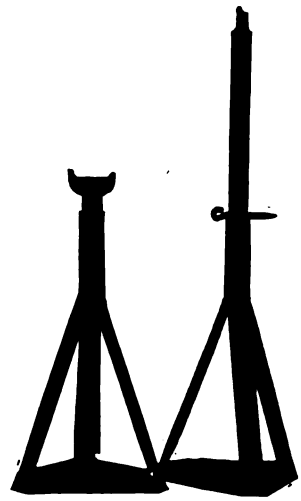
Everlasting Hose. This is a flexible gasoline hose in which no rubber is used; at the same time, however, it has the flexibility of rubber tube. It is constructed of a flexible steel core, covered with two plys of gasoline proof compound. Outside of this is a braid covering, which is protected by the final outside covering of water



proof woven fabric. This hose is guaranteed for one year and is sold in any length and is made in two sizes, with couplings attached.

Manufactured by Chicago Tubing and Braiding Co., Chicago, Ill. Price, ¾ inch size, $1 per foot; 1¼ inch size, $2 per foot; couplings extra.

Welded Steel Blocking. Proper repair work is entirely dependent upon the mechanic's comfort and the accessibility of the part upon which the job is being done. No mechanic can be expected to do good work if he is forced to lie on his back beneath a machine that is supported by bulky and cumbersome planks, boxes, etc. The illustration shows the Dyer welded



steel blocking, which is designed for supporting machines while work is being done on them. Being light and open in construction they take but a minimum amount of floor space, yet offer sufficient base support. They are designed for strength and soon pay for themselves by the time saved in placing them, as against that taken in placing heavy blocks and wood planks. Being adjustable to height, the work can be placed and raised to the most convenient position.

Manufactured by the G. H. Dyer Co., Cambridge, Mass. Price quoted at request.

Electric Glue Pot. An accessory which is bound to be of much value in any garage is known as Mabey's Electric Glue Pot. This glue pot is said to be extreme-

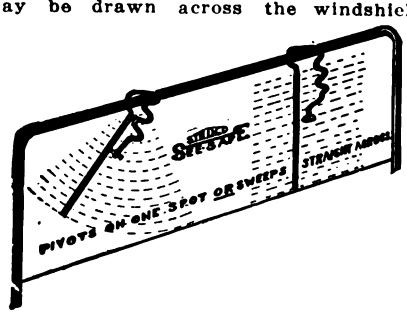


ly economical, due to the fact that the consumption of current is kept down to a minimum because the insulation prevents loss of radiation. The fire hazard, which should be kept down in a garage, is eliminated by this form of heater, which generates neither soot nor smoke.

The heat retaining jacket is constructed of heavy ingot iron, finished in black enamel, with copper glue cup and wiping rod. Each pot is supplied with a six foot cord, plug and three-heat switch for 110 volt circuit. It is made in four sizes from one to four quarts capacity.

Manufactured by Mabey Electric and Manufacturing Co., 968 Fort Wayne Ave., Indianapolis, Ind. Price quoted at request.

See-Safe Windshield Wiper. An extremely low priced windshield wiper and cleaner is introduced under the name of "See-Safe." This device is so arranged that it may be drawn across the windshield,



cleaning a rectangular space, or pivoted upon the top and swung in a half circle.

Every driver who has driven in a rain or snow storm and been forced to put his head out past the windshield in order to see the road ahead, realizes the value of a device for keeping the windshield clear.

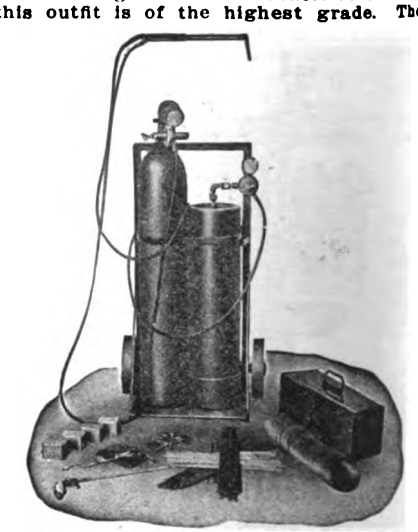
Manufactured by Studeker Metal Specialty Co., 19 S. Fifth Ave., Chicago, Ill. Price quoted at request.



"The Liberty Plane" is both one of the latest and most attractive radiator ornaments and is new and original. It suggests patriotism in a manner that is easily recognized, pleasing, yet different. It is an exact miniature of the aeroplane, cast in aluminum, highly polished and decorated with the flying emblem in red, white and blue enamel on each wing. It will not wear out and is weatherproof.

Marketed by the Defender Auto Lock Co., Inc., Marquette Bldg., Detroit, Mich. Price quoted at request.

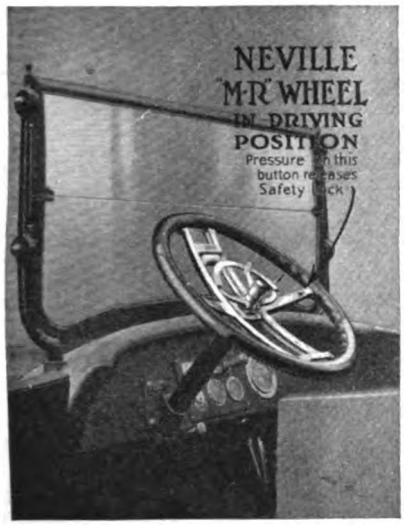
The Dyer Welding and Carbon Removing Outfit has two utilities included, that of welding and cutting by the oxy-acetylene process and of removing carbon from the combustion chambers and cylinders of engines. With this apparatus the garage man and repair man can quickly and satisfactorily do all kinds of brazing, welding of broken parts, frame straightening and many other things requiring the use of a welding outfit. The material used in this outfit is of the highest grade. The



regulators are strongly built and accurate. The Dyer company uses the United States Gauge Co.'s gauges, and the hose used is of extra heavy five-ply fabric. The outfit includes a truck made of the best grade of boiler plate strongly welded. The torches are simple in construction and easily handled, being of light design and highly efficient. The welding torches cannot backfire under any circumstances and can be operated to a low enough acetylene pressure to practically empty the gas cylinders.

Manufactured by the G. H. Dyer Co., Cambridge, Mass. Price quoted at request.

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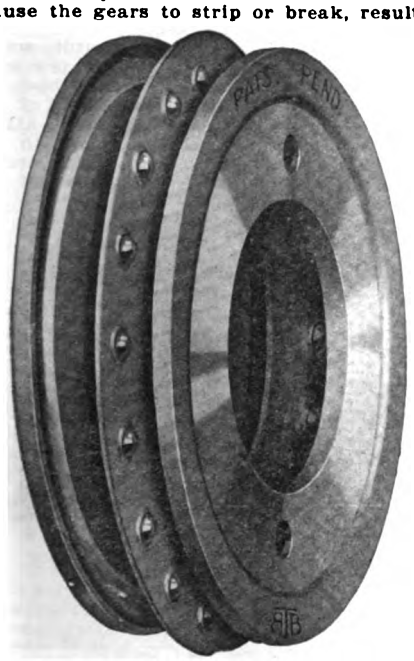




Neville More-Room Wheel. Much of the awkwardness and confusion attendant upon the climbing over the passenger on the front seat of an automobile could be eliminated if a tilting wheel were employed. The Neville More-Room Wheel is operated merely by pressing a button, releasing the lock which ordinarily holds the wheel perfectly rigid and permitting the same to be pushed forward eight inches. This wheel is made in sizes to fit nearly any car and in two styles. One has a polished aluminum center with mahogany rim and the other a plain malleable iron center finished in black.

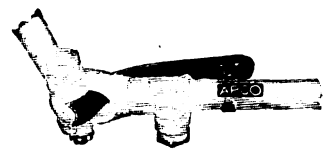
Manufactured by Neville Steering Wheel and Manufacturing Co., Congress St., Detroit, Mich. Price quoted at request.

The Bailey Ball Thrust Bearing is designed for Ford and Chevrolet 4-90. In these cars the thrust of the drive gear is taken up by steel washers having a sliding contact. If for any reason these washers wear thin the drive gear is allowed to slip away from the pinion; the gears then being partially out of mesh, the drive is taken on one tooth instead of two and on the weak part of the tooth. This may cause the gears to strip or break, resulting in other axle trouble. If this happens replacement is necessary. It is the function of the Bailey Ball Thrust Bearing to take up this thrust. Our two illustrations clearly show the construction and application of this bearing.



Distributed by Ahlberg Bearing Co., 2636 Michigan Ave., Chicago, Ill. Price quoted at request.

Two New Apco Specialties for the Ford car are just being put on the market. The first is a spindle arm anti-rattler or silencer, which is designed to prevent movement and rattling of the spindle arm bushing. The device consists of two heavy formed springs so arranged that



undue movement of the spindle arm is prevented. It is neat and compact and can be quickly attached with the fingers. The device is packed in a box and when packed weighs two ounces.

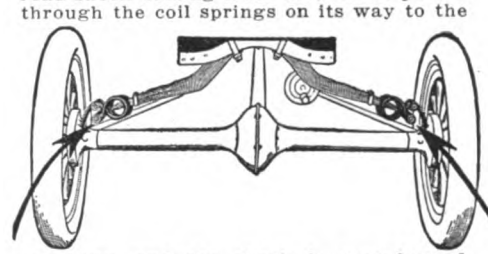
The horn button attachment, which is designed to hold the horn button on the center of the top of the steering wheel, as manufactured at present consists of a com-



plete unit with button, and is finished in black enamel. When packed in a box its shipping weight is two ounces.

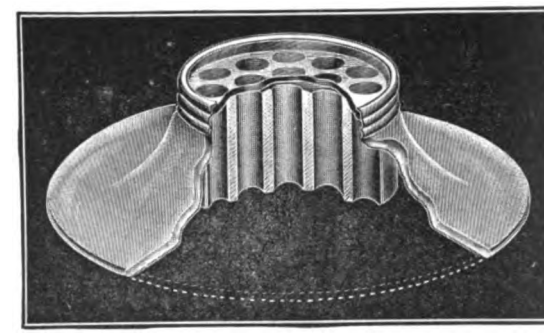
Manufactured by Apco Manufacturing Co., Providence, R. I. Price for anti-rattler, 40 cents a set; for horn button complete, 50 cents; horn button attachment without button, 25 cents.

Twin Spring Shock Absorbers for Fords eliminate jolts, jars, strains and vibration. The Twin Spring is a supplementary spring, instantaneous in its action, leaving the leaf spring free to perform the work for which it was designed. Every road shock coming from the wheels passes through the coil springs on its way to the



car body, and the shock is transformed and the life taken from it without in any way disturbing the action of the leaf springs. They are easily and quickly applied in 30 minutes to any type of car spring, and once adjusted never change their position.

Manufactured by the Twin Spring Co., 1000 Boylston St., Boston, Mass. Price, $10 per set (rear) for Fords and all cars.



The Way-A-Head Auto Lens, as the name indicates, is designed to concentrate sufficient light on the road way ahead of the car to make riding in the country safe. It is said that typewritten matter may be easily read by the light of this lens at a distance of 400 feet. To accomplish this result the light is guided and controlled by means of 19 long, narrow holes, formed through the body of glass in the lens. Each hole acts as a telescopic tube in passing a narrow beam of light with very restricted spread. For nearby light the center hub or group of holes is surrounded by a bowl shaped disc of glass, formed in one piece with the center nozzle, with all of its surface frosted, making the softest possible light, yet illuminating both curbs of the street.

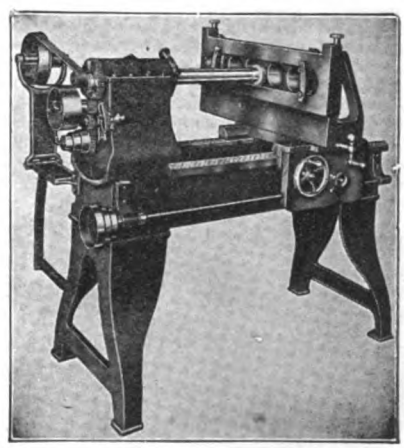
A polished plate glass cover, held in place by means of a nickel plated ring, is provided to keep dirt out of the holes.

Manufactured by Way-A-Head Light Co., Pittsburgh, Pa. Prices ranging from $5 to $6.50, according to size.

Cylinder Grinding Machine. A cylinder regrinding machine designed for grinding gasoline engine cylinders from the smallest motorcycle type to a six-cylinder block 31½ inches long is being manufactured for use in repair shops and garages, where there is a call for repair work of this sort.

The bed and legs are of the conventional type and designed to eliminate all possible vibration. The boring spindle, which is designed for strength and rigidity, is 4¾ inches in diameter by 10½ inches long and carried upon heavy bearings.

The face plate upon which the cylinder



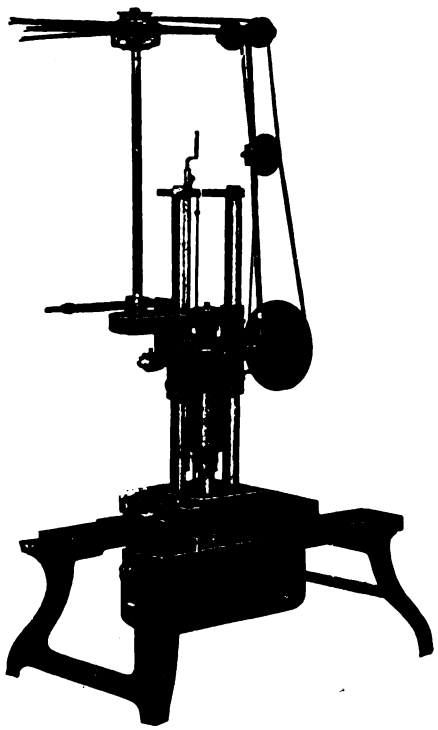
block is mounted while being ground is large and heavy, and has both a cross and lengthwise feed, the latter being automatic. It is also fitted with two knurled nuts by which the plate may be raised or lowered, thus facilitating the centering of the cylinder.

The length of the bed is 55 inches and the width 15½ inches. The height from the bed to the center of the spindle is 12 inches. The whole machine occupies a floor space of approximately three by five feet.

Manufactured by the B. L. Schmidt Co., Davenport, Ia. Price quoted at request.

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A Cylinder Grinder is shown in our illustration, with which it is possible to grind holes from two inches to six inches in diameter and up to 18 inches in length. The equipment consists of two spindles for different sized holes and three grinding wheels of different sizes. The grinder has two speeds for grinder wheels, 4500 and



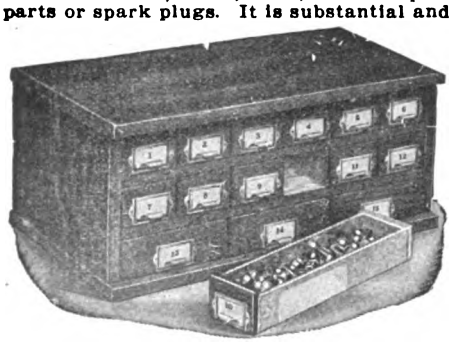
6800 revolutions per minute. The countershaft is equipped with tight and loose pulleys six inches in diameter for three-inch belt and is designed to run 600 revolutions per minute.

This machine has an automatic raising and lowering clutch and micrometer adjustment of grinder can be made instantly at any time. About one-half to one horsepower is required, depending upon the depth of cut taken. The table is 36 inches long by 24 inches wide and 24 inches high.

The makers cover the machine with a broad guarantee.

Manufactured by Pennypacker Mfg. Co., Los Angeles, Cal. Price quoted at request.

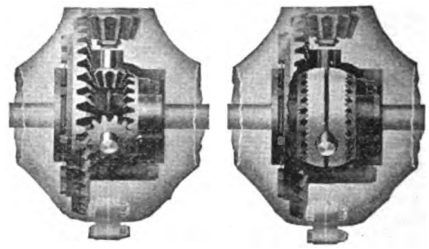
The Handy Service Cabinet, illustrated herewith, is particularly suited to the requirements of the small private garage, repair shop and supply store, for taking care of screws, bolts, nuts, small repair parts or spark plugs. It is substantial and



well finished, the front and sides are varnished oak. There are 12 small drawers, three by three by 12 inches, and three larger drawers six by three by 12 inches. The sides and bottom of the drawers are made of galvanized steel, dust proof and guaranteed not to stick. Each drawer is fitted with a combination pull and card holder, and a full set of blank cards are furnished. On the side of each drawer is a square label for stock record.

Manufactured by Stevens & Co., 375 Broadway, New York City. Price to dealers, $5.





The Badger "Two-Wheel Drive" Differential always applies the power on the wheel offering the greatest resistance. This means that the car is held steady and true to the line of drive. On a slippery surface, or when traveling in sand or mud, the wheels take the full power of the engine, thereby eliminating waste of power and wear on the tires through the spinning of one wheel. The car holds the road no matter how sharply crowned, muddy or slippery. The makers claim it is easily installed by simply taking out the three pinion gears and inserting the two Badger gears, using the same spider. The illustration tells the whole story. It is claimed that any Ford owner can do the work with his regular set of tools, or the garage can do it in from two to three hours. An attractive offer is made distributors and dealers to handle the Badger Differential.

Manufactured by the Lewis Differential Co., Milwaukee, Wis. Price quoted at request.

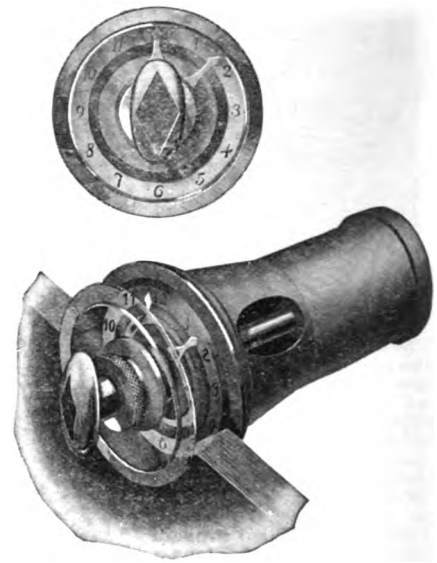
Dover Light Bulb Case. Stringent laws exist in practically every state relative to lights on automobiles. To drive an unlighted car after dark is a criminal offense and punishable by heavy fines in most states. To avoid the annoyance and pecuniary losses entailed by the burning out of bulbs and the attendant unlighted condition, every owner should always carry a complete set of spare bulbs. To carry the



bulbs in the tool box in a loose state would undoubtedly result in their breakage, so the Dover electric light bulb case has been designed. The case is made of extra heavy steel and seamless. The bulbs are held in place by spring clips and it is said that they are kept in better condition than those on the car in use. The dimensions of the box are 5⅝ inches long, 3¾ inches wide and 3⅜ inches high. The cover is fitted with an automatic spring catch.

Manufactured by Dover Stamping and Manufacturing Co., Cambridge, Mass. Price quoted at request.

Automatic Light Control. In practically every state of the Union there exists laws which require automobile head and tail lights to be lighted at dark, imposing fines upon those who do not comply with the law. If the automobile is parked upon the street this means that the owner or operator must take the time to go out and light his lights, or have them lighted. To obviate this the Semco Automatic Light Control has been designed. This device consists of an indicator dial which is marked with 12 numbers, denoting the 12 hours, and fitted with two hands. When the operator wishes the lights lighted at a certain time he turns the knob until the hands indicate the proper time. At the setting of the device a plunger starts



working and at the predetermined time electrical contact is made, lighting the lamps.

Manufactured by the Standard Electric Mfg. Co., 846 Massachusetts Ave., Indianapolis, Ind. Price quoted at request.

Rock-A-Bye Auto Seat. A unique contrivance, known as the Rock-A-Bye Auto Seat, is being marketed, which is designed to increase the comfort of the "smallest passenger" in the automobile.

This device consists of a brown washable duck basket, mounted on an enameled steel frame, the basket containing two holes through which the baby's legs protrude.

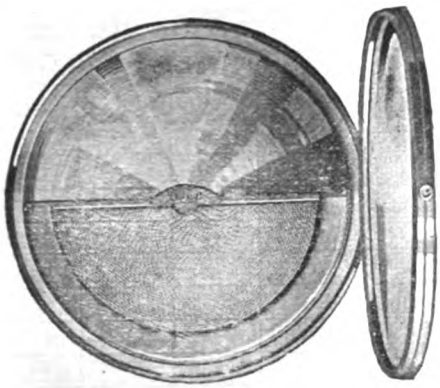
Two small steel cleats, three inches long, are furnished with the outfit, which can be permanently attached in a few minutes on any automobile to the back of the front seat, in which the hooks of the seat are engaged and sustained. All of the parts that come in contact with the polished surface of the seat are protected with soft rubber bumpers to prevent the marring of the surface.



The device is easily and quickly attached or detached, and when not in use folds up and fits under the seat. It is said to be absolutely safe and is strongly constructed.

Manufactured by the Perfection Manufacturing Co., 2700 N. Leffingwell Ave., St. Louis, Mo. Price quoted at request.

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Raydex is an all-metal, cellular device, which is placed in the upper half of the headlight behind the regular glass door. It contains more than 9000 metal reflectors, approximating nine square feet of polished reflecting surface. By means of this device all the rays which normally rise above the 42 inch level and cause glare are deflected and projected upon the road so that an even, clean cut illumination is obtained from the very front of the car to a distance of 500 feet or more. Raydex being composed entirely of metallic reflecting surfaces greatly increases the illumination on the road without requiring increased candle power in the lamp, because it saves light which is usually diffused and projects it upon the road where illumination is required.

Manufactured by the Omolite Co., Inc., Jamestown, N. Y. $6 per pair for all standard cars. Ford sizes, $5.50.

The Groetken Automatic Measuring Barrel Pump can be attached to any shipping barrel of iron or wood, ready for instant use. It pumps and measures liquids in one operation direct from the barrel into container or through a hose into an automobile tank and can be both used stationary or portable. A special barrel cart or dolly barrel truck is made by the manufacturers of this pump, which converts the entire equipment into a portable outfit. The pump is iron threaded with a tapered sleeve bung that will fit any iron or wood barrel bung hole 1½ to 2¼ stand pipe opening. It adjusts itself to height, set screws tighten up on suction pipe holding pump firmly to barrel. This pump gives instant service for automobile oils, one turn of crank displacing one pint, two turns, one quart and so on up to five gallons and repeat. All cranking revolutions are recorded on the register, plain reading of black and white figures on an enameled dial face. The cylinders are seamless brass tubing with an adjustable brass crankshaft, brass valves and the body of pump is close grained iron.



Manufactured by the Groetken Pump Co., Aurora, Ill. Price quoted at request.

The Stow Electric Buffer, originally designed for buffing the bright surfaces of automobiles, has many uses around the shop or garage. The outfit consists of an electric motor, which may be had to operate upon any voltage or cycle, direct or alternating current, direct from a lamp socket; a flexible shaft, clamp spindle and connections; also one 3x1 inch buff and one 4x1 inch buff.



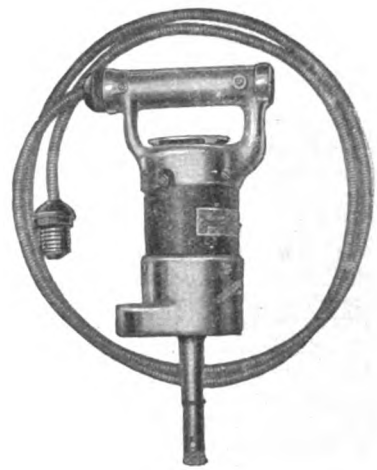
In addition to its usefulness as a buffing device for shining brass and metal work, it may be used with small grinding wheels as well. The small size machine takes wheels up to and including 2½x4¼ inches, while still heavier machines are made to take wheels up to and including 4x4¾ inches. Proportionately large buffing wheels may be used.

Manufactured by Stow Manufacturing Co., Binghamton, N. Y. Price quoted at request.

The Ajax Touring Refrigerator is made in trunk form and contains three compartments, two for eatables or bottled goods and the third for ice with a threaded compartment to prevent water leakage. It attaches to the running board and is air tight and dust proof.

Manufactured by the Ajax Trunk and Sample Case Co., 144-150 West 18th St., New York, N. Y. Price, $20.





The Stenman Electric Valve Grinder has been wonderfully improved by several convenient and practical features, which includes a larger handle, giving a better grip and balance with switch in the handle, at the finger tips and affording perfect control; flexible steel conduit for connection wires, which is galvanized and insulated, similar to that used on speedometers and which will not break or crack like ordinary cable. This cable is fitted with separable attachable plugs of a special composition and detachable both at the handle and lamp socket. All the gears are made extra heavy of phosphor bronze.

It is designed to save labor in valve grinding and will handle truck, tractor, aeroplane, marine or stationary internal combustion engine valves. This machine will operate from either direct or alternating current and can also be operated from any standard lighting circuit. Any valve can be reground in either the L, T or I head construction and the valve seat renewed in from three to five minutes as compared with from 15 to 20 minutes required with hand tools. It is now being used by the government at Camp Devens, at various aviation fields and by such concerns as the United States Steel Co., the Western Electric and Standard Oil companies and numerous garages throughout New England and New York state. It is thoroughly practical for any size establishment.

Manufactured by the Stenman Electric Valve Grinder Co., Inc., 42 Southbridge St., Worcester, Mass. Prices quoted at request.

The Cathedral Bell. A warning signal that is somewhat different from the usual signals is termed the Cathedral Bell. It is said that the tone is distinctive, unmistakable, yet musical; warning, yet does not offend. At the same time the signal is sounded a brilliant red light is flashed through the lens surmounting the bell. By this means the warning is conveyed to both the eye and the ear.



Manufactured by the Cathedral Bell Manufacturing Co., Baltimore, Md. Price quoted at request.

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MONTHLY SALES and RECAPITULATION — YEAR 19__

	January		February		March		April		May		June		Total	
	Sales	Cost	Sales	Cost	Sales	Cost	Sales	Cost	Sales	Cost	Sales	Cost	Sales	Cost
Auto Dept.														
Truck Dept.														
Tractor Dept.														
Accessory Dept.														
Repair Dept.														
Livery Dept.														
Total Sales														
Total Cost														
Gross Profit														
% Gross Profit														
Expenses														
% Expense														
Net Profit														
% Net Profit														
Memorandum of Sales	Cash	Charge	Cash	Charge	Cash	Charge	Cash	Charge	Cash	Charge	Cash	Charge	Cash	Charge

FORM NO. 5

(Continued from Page 21.)

figures will be taken from the "Daily Sales Record," form No. 3. Both columns will be totaled and entered on the lines marked "Total Sales" and "Total Costs." On the line marked "Gross Profit" will be entered the difference between the total sales and the total cost. By dividing the gross profit figure by the total sales figure you will get your percentage of gross profit and this figure will then be entered on the line marked "Per Cent. Gross Profit." On the line marked "Expense" will be entered the total expense for the month, as shown by the "Expense" form No. 4. Again dividing this figure by the total sales you get the percentage of expense and this figure is entered on the line marked "Per Cent. Expense." Subtracting the total expense from the gross profit figure you have the amount of net profit made that month, which is entered on the line marked "Net Profit," and then dividing this figure by the total sales you have your percentage of net profit. On the line marked "Memorandum of Sales" is entered the total cash and charge sales for the month.

With form No. 6, known as the "Daily Record of Cash, Accounts and Notes Receivable," a record is kept of the cash balance on hand, the total amount of all accounts receivable, also of notes receivable. Under the heading "Balance Cash on Hand" will be entered on the first line the amount of cash on hand at the opening of this system. Under the heading of "Cash Sales" is entered the amount of cash sales for the day, and under the heading "Amount Received on Accounts" is entered the total amount received on accounts receivable that day and the total of these two figures is then entered in the column headed "Total Cash Received." The total of all cash disbursements is entered in the column headed "Cash Disbursements," and under the heading "Bank Deposit" is entered the amount deposited in the bank that day. Adding the total cash received that day to the balance cash on hand for the preceding day and subtracting the amount of cash disbursements and the bank deposit you have the amount of cash on hand at the close of the day.

Under the heading "Accounts Receivable" in the column headed "Charge Sales" is entered the amount of charge sales for the day and in the column headed "Received on Accounts" is entered all credits received that day. At the start of this system you will take an inventory of your accounts receivable and enter the total in the column headed "Balance Receivable" on the first line. Then adding the charge sales to the balance receivable and subtracting the amount received on accounts you have the balance receivable at the close of each day.

Under the heading "Notes Receivable" a record of all notes is to be kept. Under this heading columns are provided for the entering of the date the note is given, the name of the giver, the amount and the date due. When the note is paid the date is entered under the heading "Date Paid," also the interest charge will be entered under the heading "Interest."

Form No. 7 is an "Invoice Register" and provides for keeping a record of all invoices and shows the total amount of all

DAILY RECORD OF CASH, ACCOUNTS RECEIVABLE AND NOTES RECEIVABLE — MONTH OF 19__

Date	Daily Cash Balance						Accounts Receivable			Notes Receivable					
	Cash Sales	Rec'd on Accts.	Total Cash Rec'd	Cash Disbursements	Bank Deposit	Balance Cash on Hand	Charge Sales	Rec'd on Accts	Balance Receivable	Date	Party	Amt	Due	Date Paid	Interest
Thirty-four															

FORM NO. 6

INVOICE REGISTER — YEAR 19__

Date	Name	Invoice Number	Gross Am't	Date Due	Terms	Date Paid	Discount	Net Am't	Total Invoices To Day	Total Invoices Paid Today	Balance Payable

FORM NO. 7

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CHECK REGISTER — YEAR 19____

Date	In Favor of	Invoice Number	Gross Am't	Discount	Other Reductions	Net Am't	Number of Check	Total Checks To day	Deposits Date	Deposits Am't	Balance in Bank
				FORM NO. 8							

accounts payable. As soon as an invoice is received and has been O. K. it is entered upon this form, entering the date of the invoice, name of the manufacturer, the invoice number, the gross amount and the date due and terms. When the invoice is paid the date on which it is paid is entered, the amount of the discount and the net amount of the invoice. At the close of the day you will total the amount of invoices entered that day and enter the total in the column headed "Total Invoices Today." You will also total the amount of invoices paid and enter the total in the column headed "Total Invoices Paid Today." In totaling the amount of invoices paid you will always use the gross amount of the invoices paid. Adding the total of all invoices today to the balance payable for the preceding day and subtracting the total amount paid you have the balance payable at the close of each day. From this form you know just how your accounts stand.

Form No. 8 provides for keeping an accurate record of all checks issued. On this form you enter the date the check is issued, the name of the person in whose favor it is drawn, if in payment of an invoice the number of the invoice is entered, the gross amount, the discount, other reductions, the net amount and the number of the check. At the close of the day you will total the amount of all checks issued that day and enter the total in the column headed "Total Checks Today." Under the heading "Bank Deposits" will be entered all deposits. Adding the amount of deposits to the balance in bank for the preceding day and subtracting the total of all checks issued that day you have the balance cash in bank at the close of each day.

Form No. 9 is the "Labor Ticket" and is used in the repair department. A separate ticket is made out for every job, entering the number of hours put in, the kind of labor, the workman, the rate per hour and the total labor charge. If any accessories are used they will be entered under the heading "Accessories" and the price entered in the column headed "Amount" and then the total charge will be entered in the last column.

When accessories are used the workman will go to the accessory department and call for the articles needed and the accessory clerk will make out a sales slip charging the owner of the car with the accessories and marking on the slip the name of the workman receiving them. This sales slip will go to the office the same as any of the other sales slips and the accessory department will receive credit for the sale. The "Repair Department" will receive credit only for the labor charge and not receive credit for the amount of accessories used. When the labor ticket comes into the office the two tickets will be compared and see that all accessories used have been charged.

LABOR TICKET — Date ____ Car ____

Charge to _____

Hours	Kind of Labor	Workman	Rate	Am't	Accessories	Amt	Total

FORM NO. 9

Now from these records the dealer knows just how each department is progressing. His records show him the total sales for each department and he knows whether the department is making or losing him money. From his stock record cards he can figure the amount of stock he should have on hand and at any time he may take a physical inventory of any article to see that all sales are being turned in as they should be. He knows the condition of his accounts payable and receivable, also of his bank account. In fact this system keeps before him constantly all the important facts and figures of his business, enabling him to have efficient control of the business.

NORTHERN FOUNDRY CO. INCREASES ITS CAPITAL.

The Northern Foundry Co., Marinette, Wis., has increased its capital stock from $25,000 to $95,000. The company was organized a year ago to specialize in gray iron castings for the automotive industry. Enlargements are being made which will double the capacity. The company has also taken over the plant of the Landover Motor Truck Co., Marinette, and this concern has taken new quarters. The Northern company at its annual meeting elected the following officers: President and general manager, J. M. Fitzpatrick; vice president, Patrick McManus, Milwaukee; secretary, Edward J. Vanderboom, Milwaukee; treasurer, Louis E. Best, Milwaukee.

The Willard Storage Battery Co. has opened a branch in Boston, Mass., with J. J. Kennealy in charge. The Willard batteries were formerly sold there by the W. H and Webster Jones Co.

COLLEGE WILL TRAIN MEN FOR FOREIGN TRADE.

A foreign trade school that will train men to engage in and specialize this branch of commerce has been opened by the division of vocational subject and civic administration of the College of the City of New York, and the purpose is to have men ready to deal with the great diversity of subjects that will be met with in exploiting trade abroad. If the object of the promoters is realized this school will prepare students whose services will be available for commercial and industrial interests.

The instructors in the school include W. M. Brittain, secretary and treasurer of the American Steamship Association; H. C. MacLean, district manager for the United States Bureau of Foreign and Domestic Commerce; S. S. Brill, former special agent for the same bureau; W. W. Orr, assistant secretary of the National Association of Credit Men, and E. E. Judd of the foreign department of the Guaranty Trust Co., New York, N. Y.

RUSH CONSTRUCTION OF NEW JANESVILLE PLANT.

With the release by the War Industries Board of the restriction of building operations, orders were given to rush as rapidly as possible the construction of the new tractor plant for the Janesville Machine Co., Janesville, Wis., the latest subsidiary of the General Motors Corporation. This is being accomplished by the addition of extra shifts of workers and the first unit of the works will be ready for equipment much earlier than was believed. The building is to be known as No. 1 and will be 514 feet long and 216 feet wide. It will be used as an assembling plant and machine shop. The purpose of the General Motors Corporation is to build farming implements and tractors at this factory, which will be operated jointly with those at Pontiac and at Stockton, Cal.

The Hess Steel Corporation has opened a branch office at 50 Church street, New York, with Daniel V. Foster in charge.

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Texas Needs 50,000 Tractors; Only Has 4,114

Fifty thousand tractors are needed immediately in Texas, according to the Fort Worth Chamber of Commerce, which has just completed a census. To purchase this number of machines will require a minimum investment of $50,000,000.

The census revealed that there are only 4114 tractors in use on the farms of the state. This is an average of one tractor to every 30,000 acres of farm land and one tractor to every 102 farms. It is estimated that Texas has only five per cent. of the necessary number of tractors.

Sixty-seven Texas counties are without a single tractor and 100 counties have less than 10 each. Only 27 counties in the state have 50 or more tractors.

A careful study of the farm tractor situation in Texas was made by the Research and Publicity Bureau of the Fort Worth Chamber of Commerce. The census was the first of its kind ever taken in the state. It is based on information supplied by food administrators, farm demonstration agents and secretaries of Chambers of Commerce throughout Texas.

The following statement, showing the possibilities of these modern farm implements in Texas, has been issued by the Fort Worth Chamber of Commerce:

"In no other state in the Union are the farm lands better adapted to tractor cultivation than those of Texas. The topography of our agricultural sections is such that tractors can be successfully operated on 90 per cent. of the farms. The vast number of large farms in this state is another element favorable to successful tractor farming. There are more large farms in Texas than any other state, and some of the largest farms in the world are in Texas. In the entire state there are 25,000 farms that contain more than 500 acres each and 50,000 farms have 260 acres or more, while more than half the farms of Texas are too large for one-man cultivation.

"We have in Texas over 660,000,000 acres of tillable land that has never been plowed. This land is all susceptible to a high degree of cultivation and most of it is as fertile as the Valley of the Nile. It is not short in productivity, but lacks adequate and modern methods of cultivation. By utilizing this vast area of idle land Texas could produce a wheat crop greater than the nation's yield for 1918, or could raise a cotton crop double last year's production of all southern states."

RAPID BRANCH EXPANSION.

The Emerson-Brantingham Co.'s business in the Sioux Falls, Ia., territory has so grown that the second enlargement of the property there within the last three years is now being made. A third story has been added, with a rearrangement of the warehouse and show room.

FARMERS' SCHOOL AT OHIO STATE UNIVERSITY.

About 25 tractor companies were prepared to be represented at the second annual farmers' tractor school of the Ohio State University College of Agriculture at Columbus, Jan. 27-31. The exhibits will include tractors and accessories and there are planned demonstrations in the laboratories of the school of military aeronautics. The program includes 10 lectures by prominent agricultural engineers, in addition to those of the college staff.

Each exhibitor will submit his tractor to a prony brake test, in accordance with the rules recently agreed on by a group of tractor company representatives. Fuel is to be weighed each 10 minutes of the test, and a check will be made each 10 minutes to tell the number of revolutions of the prony brake wheel.

Two thousand students registered last year at the school, which is held in connection with farmers' work. A two-week tractor course will be begun Feb. 14 and 300 students will be accommodated There will be no fees.

TRACTOR AGENT'S RECEIVERS CAN CONTINUE 30 DAYS.

John L. Lyttle and Herman A. Sanders, receivers of the Sanders Motors Corporation, 1876 Broadway, New York City, have been authorized to continue business for 30 days. Mrs. Hagg, whose claim amounts to about $100,000, has subrogated her claim to those of the merchandise creditors, so that the creditors may be paid in full. During the receivership the liabilities have been reduced $13,667. The company was sales agent for pleasure cars and tractors.

PABLO HOMS TRACTOR EXPORT AGENT.

Pablo Homs, Inc., has been organized in New York City with $100,000 capital to do business as commission merchants and dealers in autos and tractors. P. Homs, P. J. Bernard and C. T. Howell, 427 Fourth street, Brooklyn, are back of the company.

Service Schools for Training Avery Dealers

One of the biggest service school campaigns ever conducted by a tractor company is now being planned by the Avery company. The course of instruction will be complete, and all farmers and dealers who attend these schools are assured of securing thorough knowledge of how to eliminate unnecessary tractor service work.

Prof. L. R. Van Volkenburg, service engineer of the Avery company, will have direct charge of all the general service schools and his assistants will have charge of the local dealers' service schools. The company will have general service schools in all of the distributors' places of business and about 600 local dealers' service schools.

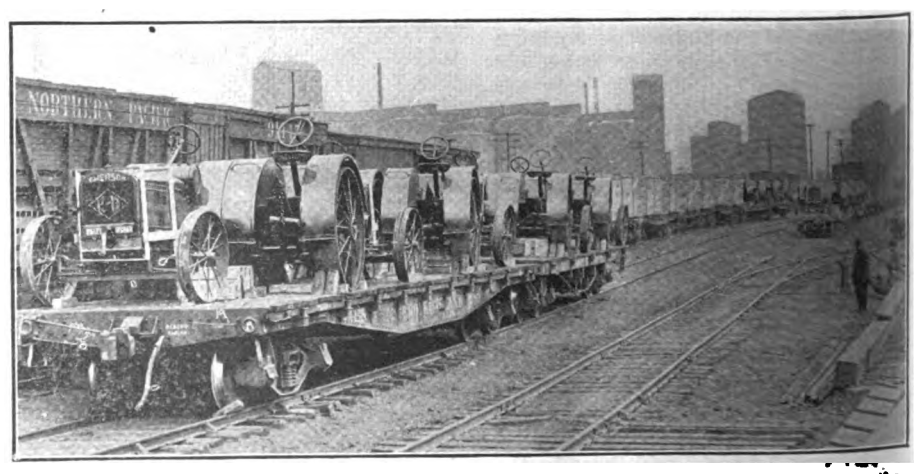
The outline of sessions will be the same in both the general and local service schools. The object of the local dealers' service schools is to reach the farmers who cannot attend the general service schools.

For those who cannot attend either of the service schools the Avery company offers a correspondence course of instruction. This course will be sent free of charge to anyone who desires to study it. It will cover the following subjects:

1. The principles of a tractor motor.
2. Carburetor—Care and adjustment.
3. Magneto—Care and adjustment.
4. Bearings—Adjustment and lubrication.
5. Valve grinding and timing.
6. The belt and draw bar transmission systems.
7. Care and operation of the tractor.

NEW TRACTOR COMPANY.

The Medina-Heke Tractor Co., Inc., Medina, N. Y., has been incorporated with a capital of $80,000 to manufacture agricultural machinery. The incorporators are T. H. Agnew, J. C. Posson and D. C. Munson, Medina.



Cars Loaded with E-B 12-20 Model AA Tractors Preparatory to Shipping, at the Emerson-Brantingham Factory at Rockford, Ill.

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CLARK LEAVES MOLINE FOR SAMSON TRACTOR.

W. L. Clark has resigned as trade manager of the Moline Plow and Tractor Co. to become general sales agent for the Samson Tractor Co. and the Janesville Machinery Co. The Moline Plow Co., having decided to enlarge the tractor department, has changed the sales organization. S. C. Turkenkoph will be chief and his assistants will be J. W. Longbon, formerly manager of the Ohio-Moline Plow Co., with headquarters at Columbus; J. D. Watson, with headquarters at Kansas City (formerly of the Kansas City-Moline Plow Co.), and J. H. Gregory, formerly manager of the Indiana-Moline Plow Co., with headquarters at Indianapolis. T. S. Wadsworth has been appointed manager of the new branch house opened at New Orleans, to be known as the Louisiana Moline Plow Co.

TWAY CO. WILL SELL SANDUSKY.

The Chas. W. Tway Co., Atlanta, Ga., southern distributor of Haynes automobiles and the Wilson trucks, has been appointed distributor of the Dauch Manufacturing Co., Sandusky, O., maker of the Sandusky tractor. Mr. Tway has great confidence in the opportunities of the tractor industry.

Frank Bishop, doing business under the name of the Briscoe Motor Sales Co., St. Louis, Mo., has taken on the Sandusky tractor. He has organized a special selling department for this new product.

BRADLEY GETS LEAVE OF ABSENCE.

L. M. Bradley, manager of the Motor and Accessory Manufacturers' Association, New York, has been given a six months' leave of absence because of ill health. C. A. Burrell, who has been in charge of the credit department, has taken over his duties.

The Emerson-Brantingham Co. has declared a quarterly dividend of 1¾ per cent. on the preferred stock.

Highway Congress Road Policy Is Approved

Chairmen of the 265 War Service Committees of the Chamber of Commerce of the United States at a meeting in New York not only concurred in the action of the Highway Congress, held in Chicago in December, but unanimously indorsed the resolution of the Congress calling for a Federal Highway Commission, a national highway system and an extension of the present Federal aid system.

S. M. Williams, chairman of the War Service Committee on Highways and president of the Highway Industries Association, said that the action at the New York meeting was strictly in accord with the feeling of business men generally throughout the country, as further shown by hundreds of telegrams and letters from chambers of commerce, national and state trade associations, rotary clubs and various organizations of commercial and agricultural interests indorsing the Highway Congress resolution and offering every cooperation for the enactment of national legislation that will remedy the present conditions and provide for active Federal participation and control over the nation's highways.

TRACTORS AT THE PORTLAND, ORE., EXHIBITION.

The annual show of the Dealers' Motor Car Association of Oregon will take place at Portland, Feb. 24-March 1. M. O. Wilkins is manager. There are 40,000 square feet of floor space and it is expected that 100 passenger cars, 35 trucks and 20 tractors will be shown.

The Siemon Tractor Co., Inc., has been organized in Wilmington, Del., with a capital of $1,000,000 to manufacture tractors, motor boats, etc.

SELL ARMY TRUCKS ABROAD IS DEPARTMENT PLAN.

The War Department plans to dispose of motor trucks and motor cars which it now has overseas by selling them for use abroad, according to a letter sent by Benedict Crowell, the assistant secretary of war and director of munitions, to C. C. Hanch, chief of the Automobile Products Section of the War Industries Board. The letter states:

"Answering your letter of the 14th instant on the subject of disposition of motor trucks in possession of the War Department, you are informed that the War Department is attempting to work out plans for selling abroad all its surplus motor trucks and motor cars now overseas. It is not desired to return any of this material to this country if it can be avoided. It is further believed that there is a demand for this material abroad and that it can be disposed of to advantage there."

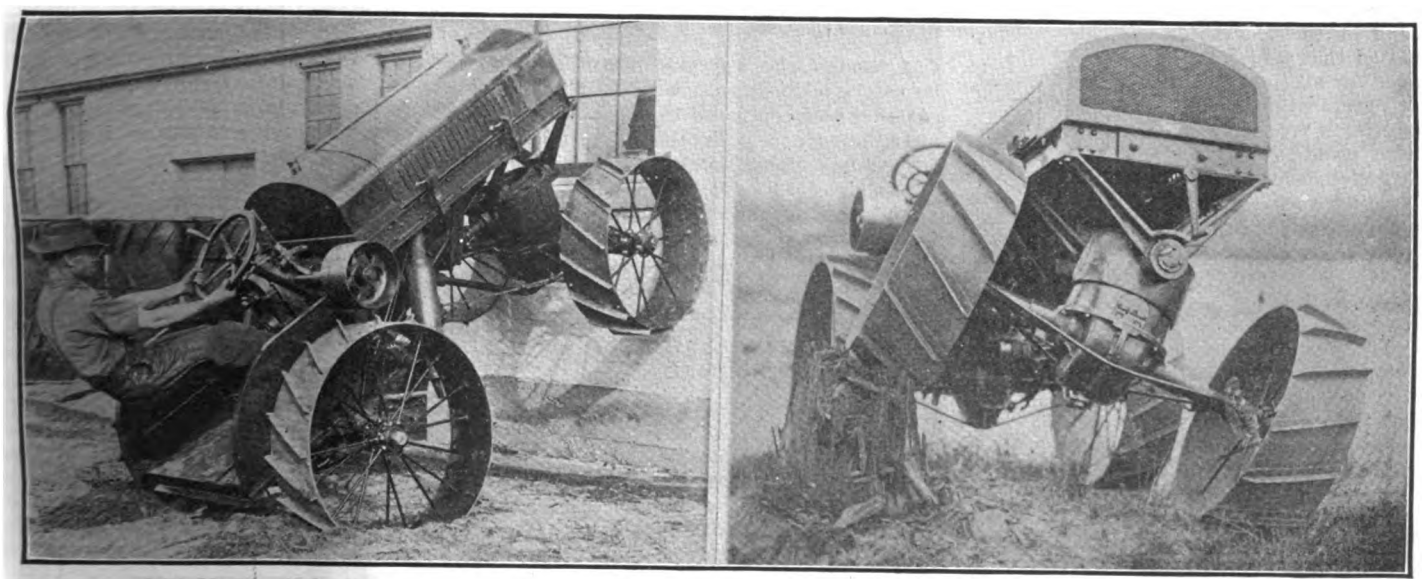
GREEN AGENCY CHANGES NAME.

The Carl M. Green Co. has changed its name to the Green, Fulton, Cunningham Co., but there has been no change in the personnel, management or policies of the firm. The business of the company will be continued in its two offices, in the Free Press building in Detroit and in the Steger building in Chicago, where separate organizations are maintained to handle the advertising of many nationally known manufacturers.

BIG INCREASE IN WHEAT PLANTING.

The county agent of Benton County, Ind., reports that the acreage of wheat in that county has been increased from less than 2000 acres in 1917 to approximately 8300 acres this past year, an increase of about 450 per cent.

Joseph J. Rumely, eldest son of Meinrad Rumely, founder of the Rumely Manufacturing Co., now the Advance-Rumely Co., died recently at La Porte, Ind.



The Power and Flexibility of a Tractor Shown at a Demonstration by a Factory Expert—At the Left Is a Fitch Four-Wheel Driven Machine with the Front Wheels High Above the Ground Against a Wall; at the Right Is a Front Wheel on Top of a Stump to Show the Extreme Oscillation of the Axle Without Stressing the Machine.

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McCormick Resigns Presidency of the I-H-C

Cyrus H. McCormick retired from the presidency of the International Harvester Co. Dec. 26. He had been president since the organization of the company in 1902. Mr. McCormick was at once elected chairman of the board of directors. At the same meeting the directors chose his brother, Harold F. McCormick, to succeed him as president.

The retiring president has long contemplated and desired this change, and he states that he would have insisted upon it several years ago but for the government suit against the company. While that litigation was in the courts Mr. McCormick did not deem it proper to seek any transfer of the obligations and responsibilities of his office.

Mr. McCormick has been in harness continuously for 34 years, 16 years of which he was official head of the Harvester company and 18 years before that as president of the McCormick company. He states that he felt that with the government suit disposed of he was well justified in passing along to his brother the duties of the presidency.

Like his brother, Harold F. McCormick has grown up in the harvester business. When he was graduated from Princeton in 1895 he returned to Chicago and entered on his apprenticeship with the McCormick company. He worked through the various departments, giving special attention to the sales end, and then became the company's general agent at Council Bluffs, Ia.

Upon the formation of the International Harvester Co. he became vice president, filling that office until he succeeded his brother as president. He was also treasurer from 1906 to 1916.

Both the Messrs. McCormick made it plain that there would be no change in the close relationship of team work that has existed between them from the beginning of the Harvester company. They stated that they felt that there would be need for all the resources of the Harvester organization, including their own best efforts, in preparing to deal with the business problems of the period of reconstruction, especially the problems of rebuilding and reorganizing the Harvester company's trade in war countries.

WILL ADD TO PERFEX PLANT.

The Perfex Radiator Co., Racine, Wis., intends to commence work on its new $100,000 plant in Racine, which project has been delayed by war conditions. The company has needed space for a long time. Motor car, truck and tractor radiators and cooling systems are manufactured by the company.

The Minneapolis Steel and Iron Co. has opened an office in the Tribune building, 154 Nassau street, New York City.

SILO MANUFACTURERS UNITE WITH N. I. AND V. A.

The Silo Department of the National Silo Association has been dissolved, and, instead, a Silo Department in the National Implement and Vehicle Association has been organized. The new department substantially took over the individual members of the National Silo Association, which, at a meeting in Columbus, O., in October, voted unanimously to recommend to its members that they take membership in the National Implement and Vehicle Association, with a view of forming a department to serve the interests of the silo industry. Manufacturers brought about the change at a recent meeting in Chicago.

The Silo Department will continue the publicity efforts of the manufacturers. The department has engaged A. L. Haecker, Lincoln, Neb., for this purpose. Mr. Haecker, as secretary of the former National Silo Association, managed the silo publicity campaign for a number of years.

Twenty-eight manufacturers who formerly belonged to National Silo Association became members of the new Silo Department. The following officers were elected:

President, Keller J. Bell, the E. W. Ross Co., Springfiell, O.; vice president, H. W. Kinney, the McClure Co., Saginaw, Mich.; secretary-treasurer, C. V. Short, Western Silo Co., Des Moines, Ia.

Executive committee, the foregoing officers and E. H. Clark, Lansing Silo Co., Lansing, Mich.; Henry Junge, Independent Silo Co., St. Paul, Minn.; W. M. Swain, Indiana Silo Co., Anderson, Ind.; George Hargrove, Des Moines Silo Co., Des Moines, Ia.

LIMED FIELDS GREATLY INCREASED HAY CROP.

In tests of ground limestone, burned lime and hydrated lime, conducted by the farm bureau through the county agent in Chemung county, N. Y., fields treated with lime produced an average of 1½ tons of cured hay an acre more than unlimed fields.

A farmer who used one ton of ground limestone to the acre secured 4840 pounds of cured hay, compared to 1208 pounds on an unlimed acre. Another, who applied 700 pounds of hydrated lime to an acre, obtained 6292 pounds against 1461 pounds on an unlimed acre. A third farmer used one ton of burned lime to the acre and obtained 3400 pounds, compared to 1040 pounds on unlimed land.

PERFECTION ROLLER BEARING CO. FORMED.

The Perfection Roller Bearing Co. has been formed in Chicago and will place on the market several new types of roller bearings, including a non-lubricant bearing and one to install on Ford rear axles. C. M. Carr heads the new organization, and associated with him are William R. Bullion as secretary and C. C. Bombaugh as vice president and treasurer.

Employment Service Will Organize Farm Labor

Adequate supplies of farm labor will be available for the rush demands next spring, summer and fall, if plans now being put into effect by the United States employment service prove successful. Indications are that the results will be entirely satisfactory, and that farmers will have no cause for worry about labor shortage.

The employment service has created a distinct farm service division, ranking with the five other major administrative divisions. This step is taken in recognition of the fact that food production is a most essential industry in the United States.

The general order creating the farm service division outlines its specific duties as follows:

(a) With the approval of the field organization division to create and perfect an efficient organization within the United States employment service which shall devote its efforts wholly to the placement of farm labor.

(b) To deal with all matters relating to farm labor that come to the administrative offices.

(c) Assisting the assistant to the director general, who will be in charge of recruiting and directing the activities of the harvesters in the "wheat belt" in the central west. (A. L. Barkman served in this capacity last year.)

Comprehensive memorandum on proposed policies of the farm service division is now being prepared. With the addition of the new division the employment service is divided into the following administrative departments: Clearance, control, field organization, farm service, information, personnel.

Another important announcement is that by a plan of cooperation between the employment service and the Women's Land Army, Inc., just approved by the secretary of labor, the latter organization will henceforth work under the auspices of the United States employment service.

The land army will continue to retain is unit organization and its own officers, but will work under the direction of the employment service so far as location of units and regulation of working conditions are concerned.

Mrs. William H. Hubert of New York will act as administrative chief of the Woman's Land Army with the employment service. The Woman's Land Army of America was organized primarily for increasing food production during the war. It came into existence in New York a year ago and from the beginning has worked in cooperation with the Department of Labor.

Ten thousand women worked in land camps last summer, and, it is estimated, 5000 more have gone out in groups or singly to lend their assistance in saving crops that otherwise would have wasted.

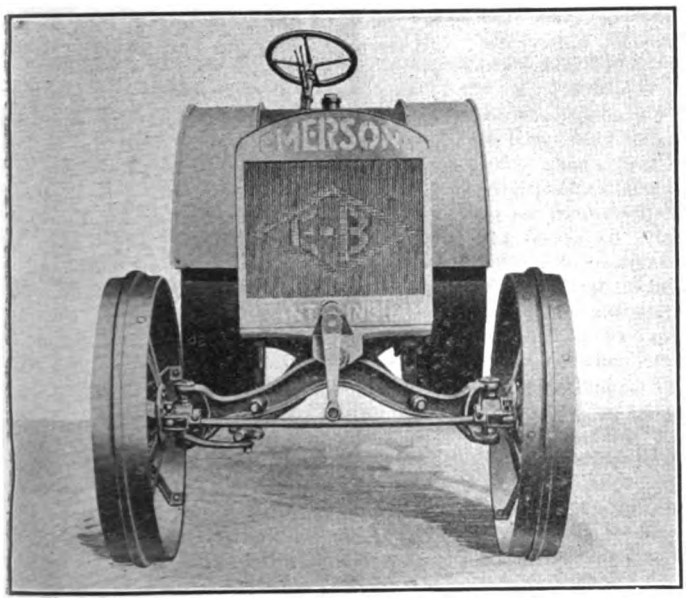
The price of the Lauson tractor was advanced to $1985 Nov. 15.

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E-B 12-20 MODEL AA TRACTOR

An Exceedingly Simplified Construction, with Four-Cylinder Engine Burning Kerosene Fuel—An Automobile Type Rated at Three Plows Capacity

WHAT is claimed to be an extremely practical and efficient machine is the E-B model 12-20 AA tractor, built by the Emerson-Brantingham Co., Rockford, Ill., which is regarded as the best design that has been produced by the engineering department of that concern. The Emerson-Brantingham Co. has built tractors for a number of years and being one of the largest manufacturers of farm implements of America, its engineers had wide experience of conditions in which agricultural operations are carried on and broad knowledge of the implements used. The experimental work was exhaustive because much care was taken to develop designs that would have the qualities necessary to meet the requirements of tractor buyers.



Front of the E-B 12-20 Model AA Tractor, Showing the Sharply Arched Front Axle, Pivoted to the Girt at the End of the Main Frame, This Having a Transverse Rocking Action to Compensate for Surface Inequalities.

For years the company had dealt with farm owners and had afforded service for implements of all kinds, and its executives were aware that machines must be constructed with large margins of safety to endure, that they must be as simple as was practically possible, that they must have efficiency, low operating cost, and that they would be operated by men who were ignorant of mechanics and indifferent to maintenance. The first tractors were large because of the belief that power farming would appeal to those who operated on extensive scales. Later on as experience established that smaller operators were quite as much interested in the economies obtainable with machines and types to meet more generally the requirements of farmers were designed and built.

Design Developed to Meet a Need.

The demand of those who operate the smallest farms on which tractors can be profitably worked led to the development of the model 12-20 AA, this being in a general way a perfection of earlier designs to obtain what would have adequate power, low operating and maintenance cost, and so constructed that it would endure for years with reasonable attention. Simplification and protection of all working parts, complete lubrication and insurance against wear were prime essentials, and claim is made that all desirable quality have been more nearly realized in this unit, with every care taken to obviate conditions that were developed by service experience in other tractors.

The model 12-20 AA is afou r-wheel, rear driven type, which may be said to generally parallel automobile construction in that it has a fixed front axle with steering knuckles, is steered by a hand wheel, with control elements that are similar to those utilized for power vehicle operation. The power transmission system has been greatly simplified and all parts are fully enclosed, the rear wheels being driven by internal gears that are housed.

The tractor has a wheelbase of 87 inches and tread of 52 inches, an overall length of 132¾ inches, overall width of 55 inches, and it can be turned in a radius of 12½ feet. The rear wheels are 54 inches diameter with rims 12 inches wide and the front wheels are 36 inches diameter with rims six inches wide. The weight of the tractor is 4355 pounds less fuel, water and oil and without the rear wheel lugs. The tractor is a kerosene burning type, but is started on gasoline, the change of fuel being made after the engine has been warmed.

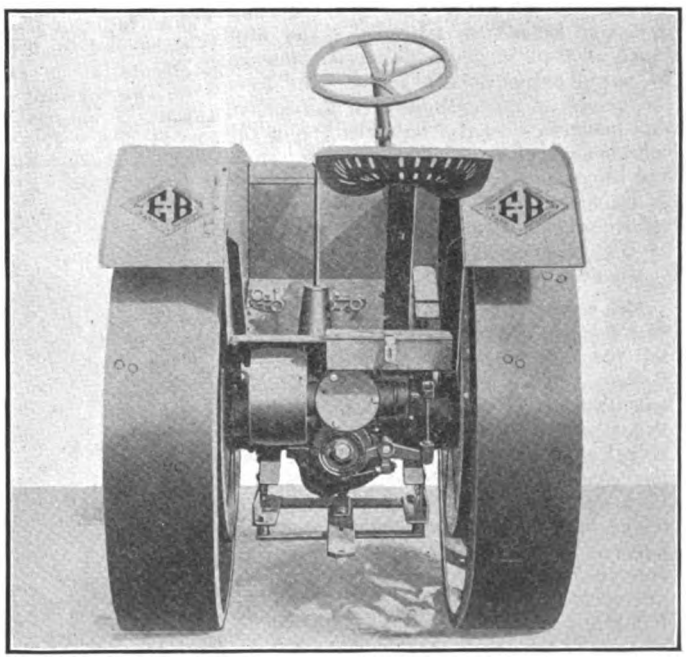
One will note from the accompanying illustration that the tractor is short and that the main frame is carried back of the front axle, but the rear axle, which is a live type, is extended through the rear of the transmission gearset case, so that a very large part of the weight is on the rear axle.

The trade name of the machine is E-B 12-20, model AA, and claim is made that it will develop 12 horsepower at the drawbar and 20 horsepower at the belt pulley. This claim, however, is very conservative, for the machine is rated for general work as having capacity to haul three plows, and four plows in stubble or in light soil. The capacity is approximately equal to what is claimed for tractors that are rated as having considerably higher power.

Poewr Plant a Four-Cylinder Type.

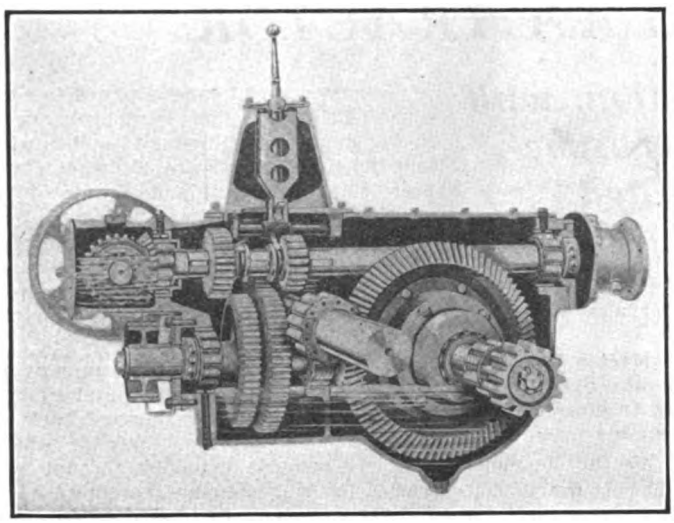
The power plant of the machine is a four-cylinder, water cooled, four-cycle, L head, vertical type, having cylinder bore of 4¾ inches and stroke of five inches. The engine would be rated by the S. A. E. formula s 36.10 horsepower at 1000 feet of piston travel, which would require 1200 revolutions a minute. The engine is normally governed to 900 revolutions, so that it would not have the output indicated by the formula, but it will no doubt considerably exceed the rating of the manufacturer.

The engine is designed for burning



Rear of the E-B 12-20 Model AA Tractor, the Wheels Not Fitted with Lugs—Under the Platform Is Seen the Belt Pulley, This Location Being Advantageous for Thresher Work.

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Cross Section of the Patented E-B Transmission Gearset—The Solid Rear Axle Revolves on Roller Bearings, Driven by the Jackshaft Pinions.

kerosene fuel and it is constructed in the shops of the company. It is not a radical design, but is rather the perfection of conventional construction by provision for accessibility so that there will be minimum labor required for maintenance and upkeep. Unusual attention has been given to obtaining cooling efficiency and adequate lubrication, and the only auxiliaries that are not housed are the magneto and the carburetor, both of which have every protection that can be given.

Cylinders Cast in Pairs.

The cylinders are cast in pairs with the water jackets and heads integral, the heads being deeply recessed for the spark plugs and the valve caps, the valves and spark plugs being completely surrounded with water to insure good cooling. The water jackets are unusually long, this being desirable with an engine burning kerosene. There are two outlets in the head of each unit to which four branches of the outlet manifold are connected, and the water when in circulation is taken in at the bottom of the unit jackets. But the water is carried upward by pump pressure and gravity and over the heads of the cylinders to the outlet, this insuring that the temperature of the combustion chambers, the spark plugs and the valves is kept to the lowest point practicable. The cylinder units are cast with heavy base flanges that are webbed at the corners to obtain strength without excess weight.

The crank case is cast in two sections. The form is designed to have a large factor of strength to resist distortion stresses. The upper section has a vertical transverse central web that carries the center main bearing, and cast integral with it are the front and rear support arms. There is a forward extension that encloses the timing gearset. The lower section is the oil reservoir and the base of the crank chamber, at the right side there being two large openings that are closed with cover plates. These are hand holes and by the removal of the plates, which are secured with a few cap screws, the main or connecting rod bearings and the oil reservoir and pump can be reached. The hand holes are large enough so that there would be no need of removing the lower section unless for an overhaul. Through them even the pistons can be taken out. The side flanges of the sections are very heavy, these strengthening the construction considerably.

While the timing gearset is practically contained in the upper section of the crank case, the lower section forms a part of the housing, and above the upper portion containing the gear assembly is a cast bracket shaped housing that carries the fan shaft. The fan is driven by a gear meshed with the timing gearset, so that there can be no uncertainty of fan action. Its speed will always be in ratio to the speed of the engine and its action cannot be variable, as might result from slipping of a belt or loosening of the supporting bracket. This positive action is regarded as being very important in tractor operation, because the engine must be efficiently cooled. The pistons are the usual type, each fitted with three diagonally split rings. The connecting rods are very heavy, the caps each being secured with four heavy bolts. The valve mechanism is the usual poppet construction, it being enclosed by plates seated on webs under the valve pockets. These may be easily removed for examination or adjustment.

The engine is cooled by a circulation of water through the cylinder jackets, forced by a centrifugal pump that is driven by an outside shaft from the timing gearset, which shaft also drives the magneto. The water is cooled by a Modine radiator that is mounted on the forward end of the chassis frame and the circulation is promoted by a large fan on the forward end of the engine. The fan is equipped with a self-operating spring clutch to compensate quick changes of the engine speed. The water capacity is seven gallons and overheating is regarded as improbable in any condition.

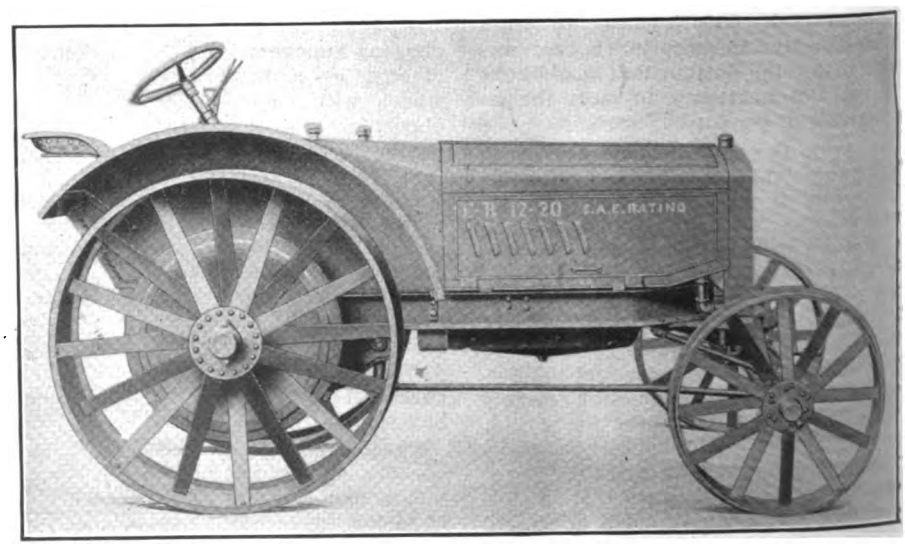
Combination Lubrication System.

The lubrication system is a combination of splash and force feed. The oil reservoir has a capacity of three gallons, a gauge indicating the level. The oil is drawn from the reservoir by a pump with a screened intake and forced through a sight gauge on the dash, and drained to the base of the crank chamber, where it is distributed by splash to the cylinders, pistons, main and camshaft bearings, timing gearset, wristpins, governor, cams and valve tappets by splash of the big ends of the connecting rods in the oil troughs. The fan and pump bearings are lubricated with grease cups.

The source of ignition current is a K-W high-tension magneto that is equipped with an impulse starter and the fuel is supplied through a Bennett kerosene carburetor that is fitted with a Bennett air cleaner. The governor is an Emerson-Brantingham construction and it is in the engine case, runs in an oil bath and is fully protected. It is a flyball type. The governor and the throttle have separate butterfly valves, so the engine cannot be raced. The fuel is supplied from a four-gallon gasoline tank and a 20-gallon kerosene tank. These are changed or controlled by two valves located on the dash, and there is provision for injecting water with the fuel for cleaning the cylinders or when operating under heavy load. The carburetor is equipped with a hot air damper controlled from the dash for supplying heat for vaporizing the fuel. The fuel is fed by gravity from the tanks.

The Power Transmission System.

The clutch is a cone type, faced with an anti-friction fabric, and it has four engagement springs which are regarded as more accessible and more easily adjusted than a single spring. The clutch is fitted with a brake to prevent spinning when it is disengaged. This clutch is mounted on the end of a very short shaft carried in the end of a large cast housing that encloses the transmission gearset, the differential gearset and the rear



Side View of the E-B 12-20 Model AA Tractor, Displaying the Enclosed Internal Driving Gears and the Construction of Wheels—This Is Essentially an Automobile Type.

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axle, which is a solid steel bar that turns on Hyatt bearings, is seated in the case. This case is long and the main shaft is at the top with a countershaft below it that drives the jackshaft, on the ends of the jackshaft are pinions that mesh with the integral ring gears on the rear wheels.

The jackshaft is under and at right angle to the main driving shaft. On the main shaft at the rear end are two sliding pinions that engage with two gears on the countershaft, and on the forward end of the countershaft is a bevel pinion that engages with a bevel gear fixed on the jackshaft. The differential gearset is in combination with the bevel gear of the jackshaft. On the rear end of the main shaft is a bevel pinion that engages through a clutch with the bevel gear on the shaft that carries the belt pulley.

Transmission Gearset Reversal of Design.

From the above description the construction may appear complicated, but as a matter of fact it is very simple. It is a reversal of design necessitated by mounting the rear wheels on a solid live axle and driving by a jackshaft. One will understand that this construction has positive traction at all times to either wheel, but where one wheel turns in a larger or smaller radius the drive of the jackshaft is compensated by the differential gearset. The gears are all machine cut and all driving gears are carried on Hyatt roller bearings. The thrust bearings are Bantam.

The gears are shifted by a ball and socket type shifting lever mounted on a tower on the cover of the housing. The gears lock at each change. The two forward speed ratios are 1.81 and 2.33 miles an hour respectively, and the reverse is the same as the low speed ratio. The drives are direct on all speeds. The belt pulley, which is at the rear of the transmission gearset housing, is 12 inches diameter and the face is 6⅜ inches wide. It is geared directly to the main shaft and has a speed of 900 revolutions a minute. It is placed under the platform, where it is easily accessible, and which is claimed to be very advantageous for thresher work, as there is no need to move the thresher belt to move the tractor. The pulley shaft is mounted on heavy Hyatt roller bearings and it is controlled by the main clutch. As the compartment in which the belt pulley driving gears is separated from the main case for the transmission gearset and the pulley is operated only a part of the time, this compartment can be filled with a semi-fluid oil instead of the higher grade that is used in the gearset case.

Frame Two-Pieces of Steel Channel.

The main frame of the tractor consists of two members, each with one end bent so that when these ends are joined by a girt a U-shape construction is formed. This girt is a semi-steel casting, and is coupled by a pivot to a cast steel axle that is sharply arced in the center. The axle may rock on this pivot so that the front wheels may be carrying the weight alike, no matter what the inequalities of the surface of the ground. The front axle is equipped with large steering knuckles of automobile type, and the wheel spindles are connected with substantial linkage. The steering gear is a worm and gear type that is enclosed in a grease and dust tight case that is packed with hard grease.

The wheels are built up, having rims with turned edges to afford strength. The hubs are semi-steel castings, and the flat rod spokes are hot riveted to the hubs and rims, these being staggered to insure resistance to stresses of all kinds. The rear wheels are fitted with fenders and dust shields and between the wheels and ahead of them is a cowl dash, under which are the fuel tanks. The engine is covered with a hood of automobile type. On the dash are the oil gauge, gasoline valve, kerosene valve, hot air damper and water valve. On the steering column are the ignition and fuel hand levers, and there is a combined clutch and brake pedal and the gear shifting lever. There is a comfortable spring seat for the driver and a metal tool box under the seat.

EVELAND DIRECTS MAXIM CORPORATION SALES.

F. Winsor Eveland has become associated with the Maxim Munitions Corporation, New York, N. Y., as vice president and sales director. He will take care of the activities of the organization from 120 Broadway. A wholesale business is conducted by the company in a territory comprising the states east of the Alleghenies, from Florida to Maine, and it does an export business over the entire world. Mr. Eveland was formerly manager of the Peerless Motor Car Co.'s branch in Philadelphia, carrying on both retail and wholesale business in Peerless cars and trucks.

FALLS COMPANY WILL PRODUCE NEW TRACTOR ENGINE.

The Falls Motors Corporation, Sheboygan Falls, Wis., has placed in operation a large plant addition, representing an investment of more than $225,000, enabling it not only to increase its output of passenger and commercial vehicle power units, but also to engage in the production of a special tractor type, heavy duty engine. The company expects a heavy volume of business in the new tractor engine.

RILEY TRANSFERRED TO HARRISBURG.

A. D. Riley has been appointed sales manager of the Harrisburg, Pa., branch of the Emerson-Brantingham Implement Co. He was formerly assistant manager of the Peoria, Ill., branch of the company. P. M. Cantner has been appointed assistant manager of the Harrisburg branch of the Emerson-Brantingham Implement Co. He was formerly a salesman for the company.

Lee Beeler, Toledo, will distribute Cleveland tractors in 25 counties in northwestern Ohio and in numerous counties in southern Michigan. Mr. Beeler is state distributor of the Dort car in Ohio.

SMITH IS PARRETT DISTRICT SALES MANAGER.

The rapid development of the business of the Parrett Tractor Co. of Chicago is necessitating a general expansion all along the line. Frank H. Smith, well known in the automobile industry throughout the country, has joined the Parrett sales organization. He will be district sales manager, with duties similar to those in which he has been engaged for the last 12 years with such automobile firms as Studebaker, Hudson and Chalmers. His extensive experience well fits him to handle the important work assigned to him in the Parrett organization.

Mr. Smith has perfect confidence in the tractor industry. "The possibilities of the farm tractor," he said, "are so far-reaching and the reports concerning the successful service record of the Parrett tractor are so remarkable, that I could not do other than to avail myself of the opportunity to come with the Parrett Tractor Co."

PITTSBURGH COMPANY'S SUCCESS SELLING TRACTORS.

The Tranter Manufacturing Co. of Pittsburgh has made a notable record for its success in selling Avery tractors. The company is a pioneer in the gas engine business in Pittsburgh, having followed along very successfully the development of the gas engine. It still furnishes gas, gasoline and oil engines for town electric lighting and water works plants, as well as for all private uses down to the small engine which is used by the farmer for the milking machine.

With the event of the gas tractor the company took up the distribution of the Avery gas tractor, a few years ago, and now has a very prosperous business in the sale of them.

FORDSON PRODUCTION FOR 1919 PLACED AT 52,000.

Previous production records were smashed at the plant of Henry Ford & Son the week of Dec. 20, when a total of 1057 Fordson tractors were made. A record for a single day was established Dec. 20, with 197 tractors. The total output in the next 12 months, according to the present rate of production, will be more than 52,000 tractors.

BIG TRACTOR EXPORT ORDER.

The Turner Manufacturing Co., Port Washington, Wis., has received a contract for several hundred machines for exportation to Italy. It will require 100 flat cars to ship the order from the factory to the seaboard. The company manufactures the Turner-Simplicity tractor.

The Bishop Truck and Tractor Co., which will distribute Sandow trucks, was recently organized in St. Louis, with Frank Bishop president. Mr. Bishop is also president of the Briscoe Motor Sales Co.

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Extension Controls For Operating Tractors

Although many thousand tractors have been built and sold and used on farms for field operations and for highway haulage, until within the last two years practically all were intended for working machines primarily designed for operation with animals. From the viewpoint of economy the use of horse equipment must be regarded as a makeshift at best and far from being as productive as what has been developed especially for working with tractors.

There is another aspect, quite as important, and that is the need of minimizing the investment the farmer must make to utilize tractors. The need of purchasing tractors and special implements might not be prohibitive of sales, but there is no doubt that it would greatly lessen them. Practically every tractor buyer who owns animal machinery desires to use them in combination, and much careful study has been given to devising "hitches" or methods of coupling tractors and implements so that they can be operated productively.

As practically all animal implements are intended to be controlled by the driver riding on them, when they are used with tractors on which the drivers must ride there is need of additional operators on the machines, which does not greatly lessen the expense of labor, and substantially decreases the productiveness who based on cost of operation. This has been met in two ways—by building implements that may be coupled to the tractors and controlled by the driver, or by designing means of control which can be extended so that a man riding on an implement can operate the tractor.

The accompanying illustrations are especially interesting in that they show how California farmers owning tractors have made use of control extensions, with which the machines can be utilized to the fullest productivity. These extensions are so constructed that the drivers, seated or standing on the machines, can operate the tractors with the same nicety that would be practical if they "rode" them, and yet they can equally well regulate the operations of the implements. These extensions save the labor of one man with each outfit.

Two of these show a Samson Sieve-Grip tractor hauling a nine-foot Deering combined harvester worked on the farm of M. G. Morgan, near Dixon, Cal., and with this equipment Mr. Morgan harvested 1000 acres during the season, averaging from 20 to 22 acres a day. During that period of time his expenses aside from fuel and labor, were $3 for repairs.

The other two illustrations are from photographs made on the Phiel ranch, near Hanford, Cal., and show a Samson tractor hauling a six-foot Hanford scraper, which was used for leveling.

Both sets of photographs show the tractors in operation, and again the means of coupling and the control extensions. In either instance the tractor is worked to full capacity and with equipment that, though originally designed for animal operation, can be utilized to fullest capacity.

MAY INCREASE MACCAR CAPITAL.

A special meeting of the stockholders of the Maccar Truck Co., Scranton, Pa., has been called to take action on a plan to increase the capital stock of the company from $300,000 to $500,000. P. L. Sylvester is president of the company.

PACKARD COMPANY PLANS FOR NATIONAL BUSINESS.

The Packard Motor Car Co. has founded an organization to serve particularly the transportation requirements of what is generally known as national business. The men selected to shape this service to truck users of national character are Packard men of wide experience in the field of motor transportation. They are A. C. Harrington, who for the last year has been vice president of the distribution for the Packard Motor Car Co. of New York, and F. H. Pietsch, manager of the truck distribution for the Packard Motor Car Co. of Chicago.

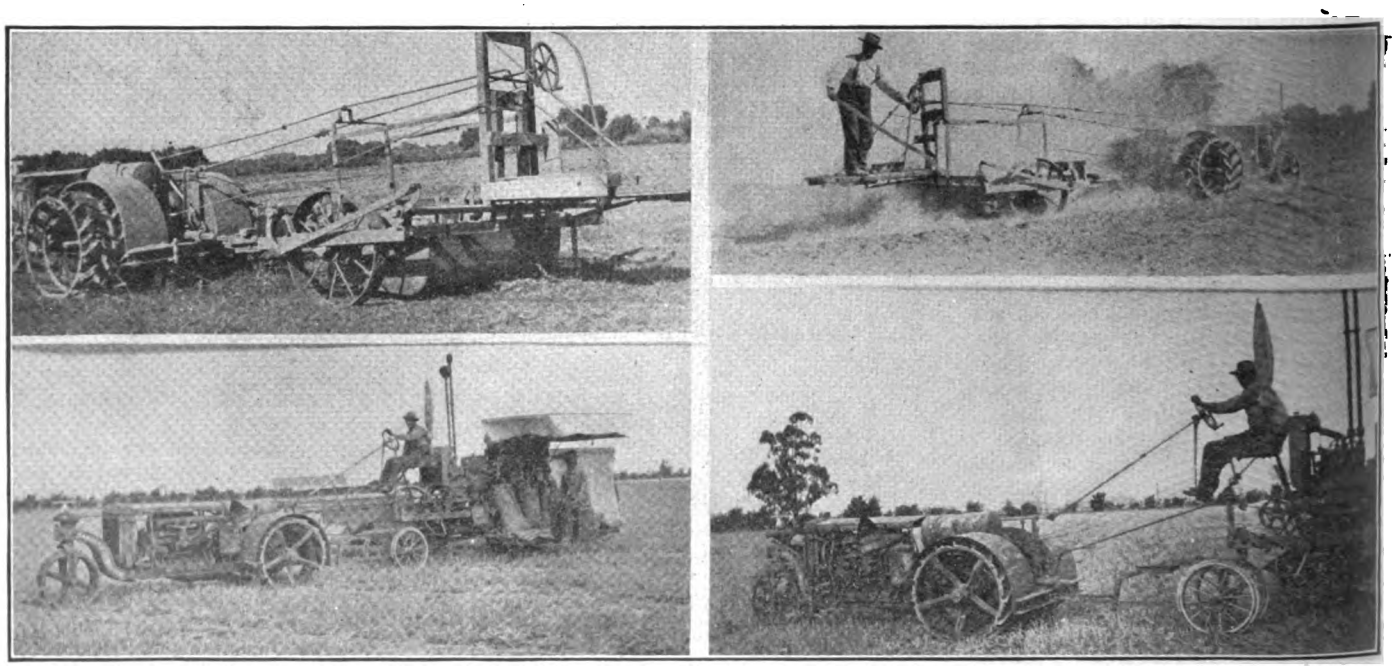
Mr. Harrington, with headquarters in New York, will have as his territory the eastern section of the United States. He has already associated with him in his organization James T. Adams, until recently manager of the Washington office, through which the Packard company served the motor transport need of the government during the war.

Mr. Pietsch, with headquarters in Chicago, will have as his territory the western section of the country east of the Rocky mountains. The home offices of the majority of companies during a national business are in New York and Chicago.

GOODYEAR HONOR ROLL.

Names of 70 men who gave their lives for their country appear on the honor roll of the Goodyear Tire and Rubber Co., Akron, O. A little better than one per cent. of the men who joined the colors from this big plant made the supreme sacrifice.

Glenn B. Miller has assumed the duties of general sales manager of the Nelson Motor Truck Co., Saginaw, Mich.



Samson Sieve-Grip Tractors Equipped with Extension Control, Utilized by California Owners for Agricultural and Road Construcion Work. The Upper Illustrations of the Group Show a Six-Foot Hanford Scraper Used for Leveling a Highway, That at the Left Being a Close View of the Hitch and That at the Right the Outfit at Work; the Lower Illustrations Are of a Tractor and a Nine-Foot Deering Combination Harvester Used by M. G. Morgan of Dixon, Cal., with Which 1000 Acres Was Harvested, at an Average of from 20 to 22 Acres a Day. At the Left Is the Combination as Used for Harvesting, and at the Right Is Shown the Hitch and the Control Members, Handled by the Driver on the Seat of the Harvester.

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STUDEBAKER PLANT TO HAVE 100,000 CAR CAPACITY.

The Studebaker Corporation expects that the construction of the modern new automobile plant, which it started at South Bend, Ind., in 1916, will be completed Jan. 1, 1920. The new plant will have a capacity of 100,000 cars per annum which, with the facilities of the Detroit plants of 60,000 cars per annum, will double the capacity of the corporation and give it manufacturing advantages unexcelled in the country from the standpoint of efficient and economical manufacture.

The new Light-Four cars will be produced at South Bend, while the Detroit plants will continue the production of six-cylinder cars and automobile parts.

The total area of the South Bend buildings will be 2,384,500 square feet, consisting of a machine shop, assembling building, foundry, forge shop, heat treating building, stamping plant, tool room, car testing building and shipping platform. The buildings are of modern type, concrete and steel production, and are grouped to promote the simple, quick and economical movement of work in progress necessary to quantity manufacture and low costs.

Coming at a time when the whole world is faced with reconstruction, this noteworthy expansion of the Studebaker's manufacturing facilities is ample evidence of the corporation's unbounded faith in the future of the automobile industry.

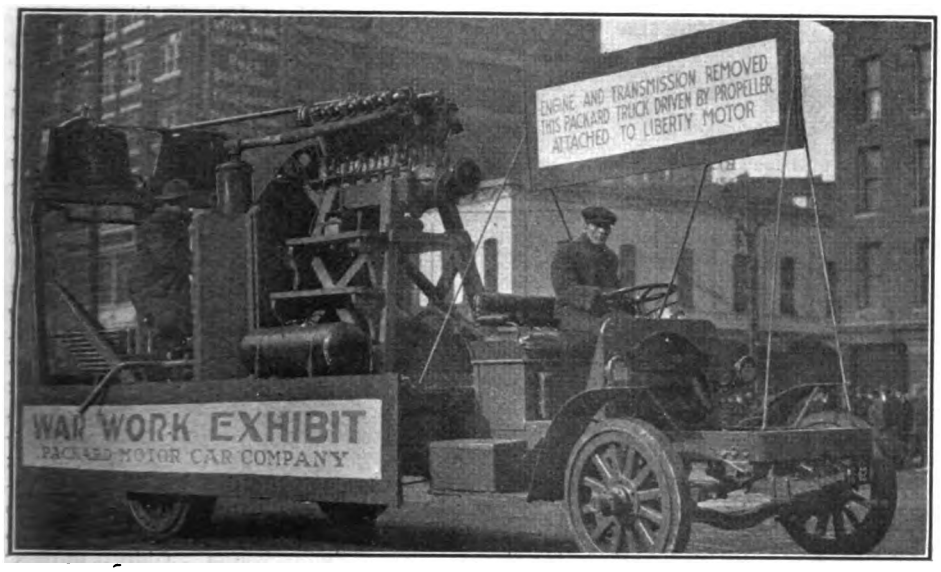
FOREIGN TRADE OPPORTUNITY.

Consular reports, issued by the Bureau of Foreign and Domestic Commerce, Department of Commerce, states that a merchant in Algeria desires to secure an agency for the sale of automobiles and auto trucks of light and heavy construction and limousines. The name and address may be obtained by application to the bureau. The "opportunity number" is 28017 and should be referred to in the application.

Drive Truck Chassis with Aeroplane Power Plant

An unusually interesting exhibition of the great power of the Liberty Motor took place in Cadillac square, Detroit, when on a Packard three-ton truck, on which one of the aviation engines was mounted, was driven around the square and put through manouvers by the power of the air propeller alone.

In order to make the demonstration more impressive the radiator, hood, motor and transmission gearset had been removed from the truck. Spectators were shown that atmosphere, usually regarded as a negligible quantity, is a heavy and dense enough medium for an air propeller to drive a truck weighing 7000 pounds, not only at the speeds of a swift passenger car, but slowly and steadily in abrupt turns, figure "eights" and serpentine curves.



Packard Truck Chassis, Driven by a Liberty Motor and an Aeroplane Power Plant, During a Demonstration of War Products at Cadillac Square, Detroit.

Included in the display, which was part of the Packard war products exhibit of the Detroit branch of the company, were the four Packard aircraft motors, showing the successive steps in the development of the Liberty Motor. The first of these is the Packard "299," built in 1915 and tested out in a racing chassis by Ralph De Palma. The second and third were the "905, the First and Second."

Another feature of the exhibition was a Le Pere plane, designed and built in the Packard plant under the guidance of the French Aviation Mission to America. The plane is equipped with four machine guns, and is said to be the fastest all-around utility and fighting plane yet produced. De Palma's racing car was shown.

Great interest was manifested in a truck, 10,000 of which are in overseas service. The truck is the same that helped to turn the tide of battle at Chateau Thierry by bringing up 50,000 rounds of machine gun bandolier ammunition at a critical time.

Minute inspection of the parts of the Liberty Motor was afforded by one of these motors disassembled.

This was the first public demonstration of the Packard war products. Brig. Gen. L. R. Kenyon and staff of the British army were present. The general is in America to thank manufacturers for contributions of war products to British forces.

WAR DEPARTMENT BUYS TIRES TO COST $1,000,000.

The government has placed orders for $1,000,000 worth of tires with the Goodyear, Kelly-Springfield, Fisk, Firestone and Pennsylvania tire companies. The tires are for motor trucks in this country and abroad. At the same time an order was given to the Trailmobile Co. for 1000 cargo trailers. Orders were placed as follows:

Trailmobile Co., Cincinnati, O., 1000 cargo trailers, $596,000.

Goodyear Tire and Rubber Co., Washington, 5750 casings, 6000 tubes, $230,720.

Kelly-Springfield Tire Co., Cleveland, 2000 tires, $80,680.

Fisk Rubber Co., Washington, 3765 casings, $57,003.50.

Firestone Tire and Rubber Co., Akron, 1965 casings, 5875 tubings, $76,874.25.

United States Tire Co., New York, casings and tubes, $388,112.50.

INCREASE OF TAXES THREATENED IN OHIO.

A proposed law to be presented to the Ohio Legislature would take motor vehicles off the personal tax duplicate and substitute an increase in the registration fees. The plan is to return half of the money so secured to the communities in which the taxes originate. The object is to tax automobiles and other motor vehicles to provide for highway improvement and repair. It is claimed that the plan is legal and workable if the recently adopted constitutional amendment classifying property for taxation is upheld by the courts.

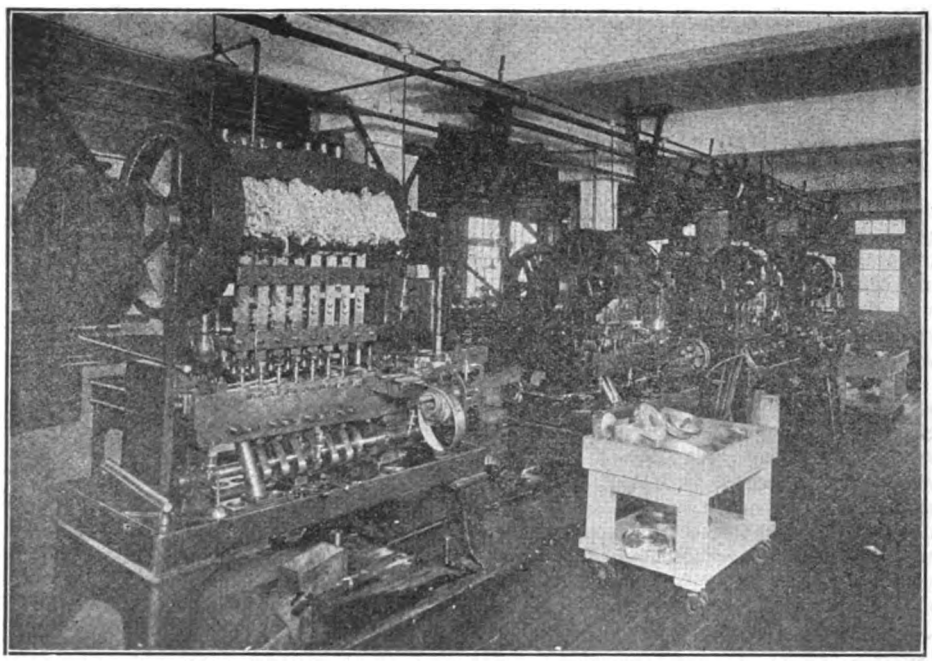
WANT CANADIAN WAR TAX SUSPENDED.

Representatives of the organized automobile industries of Canada waited on Sir Thomas White, acting prime minister, and Hon. A. K. MacLean, acting minister of trade and commerce, and urged that the excise war tax on automobiles be removed. The tax is 10 per cent. on automobiles and is applied to all imported into or manufactured in Canada and unsold on April 30, 1918. The request of automobile manufacturers at Ottawa is being considered.

TRUCK OWNERS ORGANIZE EMPLOYMENT BUREAU.

The Motor Truck Owners' Association of Philadelphia is considering the formation of a central employment bureau for reliable chauffeurs and other employees. With a view of opposing high insurance rates on trucks the association is collecting data on insurance risks.

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Section of the Automatic Press Department, This Demonstrating the Class of Equipment of the Plant and the Facilities for Production.

(Continued from Page 15.)

whom are women, some of whom operate machines. Women machine operators have been employed by the company since it located in Waltham, and statement is made that they have been found to be decidedly efficient and productive. This applies especially to those who have had long experience.

Because its machine equipment was adapted to production of small metal parts the company obtained early in 1916 a contract with the British government to make components for shells, and developed a special process for production by which the quality was improved and the number produced exceeded by a large margin the output of the machines used for this work by other concerns. In 1917, when the present plant was occupied, it was adapted so far as commercial production would permit to undertake war contracts, and eight of these were obtained in all. These called for upwards of 40,000,000 pieces. During the period when the demand was greatest two of the departments were operated day and night, and others would have been placed on the same production basis had help been available. The company is stated to be the first of all government contractors that completed its contract schedule ahead of the time specified. Since the armistice of the European war, which practically ended hostilities and greatly diminished the demand for war service products, the company has been converting its equipment as rapidly as conditions have permitted to produce its own specialties.

Timer Production Capacity 3500 a Day.

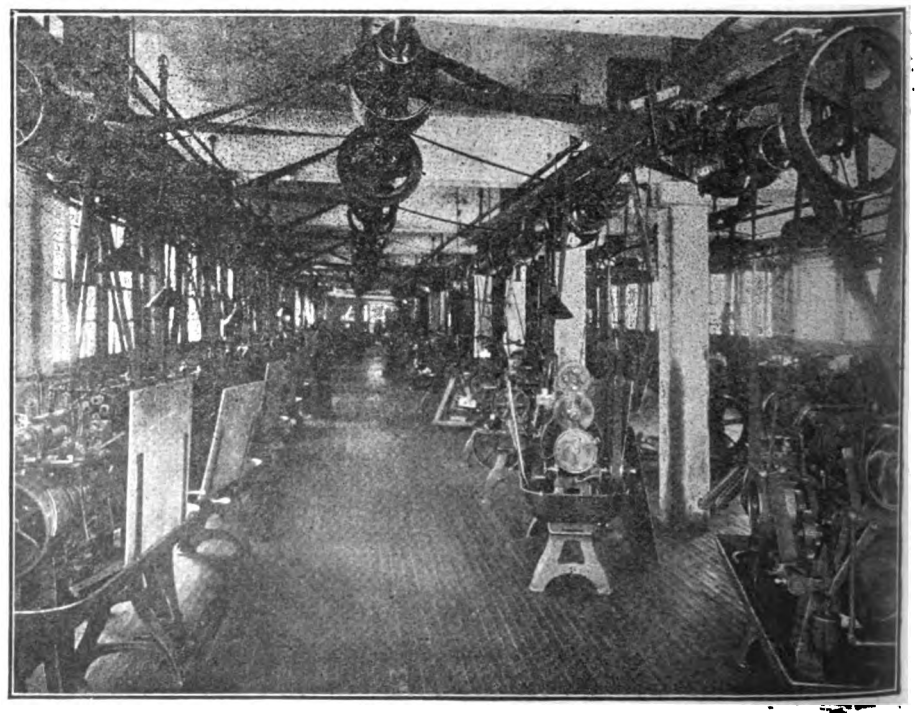
It is now in readiness to meet any demand for timers, which it produces in greatest number of its specialties, and it now has a capacity of about 3500 timers a day, or somewhat more than 1,000,000 a year. The other products are in less volume, but the outputs of each is increasing rapidly. The company has a spur track from the Boston & Maine railroad into its property, so that car load freights can be received at or shipped from the plant. The smaller shipments or receipts are shipped from or received at Boston and transferred from or to the factory by truck. These facilities are a decided advantage in that deliveries can be made without delay and orders can be filled quickly.

The general manager, F. C. Hersee, has been identified with the company since its organization, and the development of the concern has been largely because of his faith in the commercial possibilities of the Bemus timer and his judgment of the practical sales values of the other specialties. Since the company was established a number of other products have been specialized, among them being the Fogg horn, the Blazer horn and the Excel jack, this being a long handle type especially designed for garage and service stations and where heavy work is done.

How the Products Are Marketed.

The products of the company are marketed in the United States and Canada under the direction of Sales Manager A. Fraser, and through the Bailey-Drake Co., Chicago, which is the sole distributor. The Bailey-Drake Co. operates on a large scale, maintaining a general office at 1118 South Michigan avenue, Chicago, and having a sales organization that covers a very large part of the United States and the various provinces of Canada, its traveling representatives having headquarters in principal commercial centers, from which they make trips at regular intervals.

The staff is made up of well trained salesmen, whose activities are directed from the Bailey-Drake office, with which Mr. Frazer is constantly in communication. The executive of the Bailey-Drake Co. is Edward E. Drake, who has had a very long experience with the automotive industry and the trade, and his staff consists of R. E. Voorhees, with headquarters at Seattle, whose territory consists of the states of Washington, Oregon, Idaho, Montana and Utah, and the provinces of British Columbia, Alberta and Saskatchewan in Canada; Paul Gardiner, with headquarters in San Francisco, who travels through the states of California, Arizona and Nevada; L. A. Staff, with headquarters at Minneapolis, whose regular circuit includes the states of North Dakota, South Dakota, Iowa, Minnesota and Wisconsin, and the province of Winnipeg, Canada; F. V. McGraw, with headquarters at Dallas, Tex., who covers the states of Texas, Oklahoma, Colorado, Louisiana, Arkansas, New Mexico, Kansas, Nebraska, Missouri and Wyoming; Walter Watson with headquarters at Buffalo, N. Y., whose territory is extreme western New York, extreme northwestern Pennsylvania, Ohio, Indiana



The Automatic Screw Machine Department, Showing Four Rows of Tools and the Exceptional Lighting for the Workers.

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The Executive Office: Treasurer and General Manager F. C. Hersee at Left and Sales Manager A. Fraser at Right.

and Michigan, and Charles W. Unbehaun, with headquarters in New York City, who travels the provinces of Nova Scotia, New Brunswick and Quebec in Canada, Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, New Jersey, Delaware, West Virginia and District of Columbia.

The other states and districts and provinces not covered by the salesmen direct are reached through sales connections of the Bailey-Drake Co. The distribution is principally to large jobbing houses and through these to the various dealers. The export business is transacted through an office of the Motor Specialties Co. at 80 Wall street, New York City, which is in charge of H. L. Cross. This division handles a considerable part of the business and has become very important, for the products of the company are widely known abroad.

The company has very systematically developed its sales department. Twice a year are called together for conference and the plans for promotion and stimulation of business are carefully determined. Careful attention is given to delivery and the shipments are made so that there shall be no delays that can be obviated. The business of the company exceeded $1,850,000 in 1917, and this year it is expected to be approximately $2,000,000.

Incidentally reference should be made to the attention the company has given to the welfare of its employees. The working conditions are ideal from the viewpoint of lighting, ventilation and other phases of sanitation, and in the restaurant excellent meals are provided at cost. In the rest room there is a victrola so that those who desire may enjoy dancing after eating. There is a series of tennis courts on the property that is free to the employees and is much used during the part of the year that outdoor recreation is practical. The company draws its employees from three residential towns and has what is regarded as a superior class of labor. This and the extremely cordial relations existing between the company and its workers is a very substantial reason for the high efficiency that has been developed in all departments.

The company has the exclusive manufacturing right for every specialty it produces. Before developing or acquiring any product the commercial possibilities are carefully estimated and decision is based on long experience with the market. Very recently the company purchased the patent and manufacturing right for the Jiffy bushing extractor of the Jiffy Tool Co., Whitman, Mass., a tool that is especially adapted for use with Ford, Dodge, Dort, Chevrolet, Saxon and Overland cars, and is desirable both for the tool box and for the work bench of every garage and repair shop. Practical utility and wide general use insure a demand that will continue for a long period, and these are the determining factors with the company in establishing the commercial value of a device or fitment that it can exclusively control.



H. L. Cross, Export Manager for the Motor Specialties Co.



Edward E. Drake, Executive of the Bailey-Drake Co., Chicago, Distributor of Mosco Specialties.



Charles W. Unbehaun, New York City and General Eastern Salesman.



Paul Gardiner, California and Southwest Salesman for the Bailey-Drake Co.



R. E. Voorhees, Pacific Coast and Northwest Salesman for the Bailey-Drake Co.



F. V. McGraw, Middle West and Southwest Salesman for the Bailey-Drake Co.



L. A. Staff, Northern Middle West Salesman for the Bailey-Drake Co.

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PLATE XXVI.

MOTOR TRUCK SERVICE STATION

Structure Designed for Corner Location, Equipped with Every Facility for Efficiently and Economically Serving Truckmen.

SERVICE as demanded by the power truck owner differs widely from that required by the passenger car owner. Many truck dealers have established service stations for serving owners of the trucks they have sold, and have generally sought the patronage of owners of other makes of trucks when service could consistently be afforded.

The power truck service station should preferably be in building erected expressly for the business, for this will mean, if the arrangement of the structure is well thought out, economies of many items of expense, such as lighting, heating, handling vehicles, labor and time, as well as improving the efficiency of the organization and insuring satisfaction to customers.

Necessarily a plan must be definite and specific, and in the accompanying plate the architect has made provision for a structure on an ideal site, but this may be modified and the details may be amended to meet other conditions. The purpose is to suggest what shall be regarded as a structure that will meet all ordinary requirements and afford every desired facility for economical conduct of a business.

The proposed structure is shown on a corner lot, 100 by 100 feet. The dealer will at once appreciate the desirability of selecting a corner location for his building, as it has many advantages for a motor truck service station. Principal among these is the fact that entrances may be had from both streets (see plan), allowing easy placing of trucks for storage.

Special attention to the larger types of motor trucks is given in the design. At the rear, with an entrance from the street, will be found a large repair shop, which may also be reached from the inside.

Directly opposite is found the machine shop, where work of any kind may be carried on. A large door leads from this so that any unit or an entire truck may be carried to the shop for any necessary work. Between the machine shop and the repair shop is a large combination turntable and wash stand. With this trucks may be sent to the repair shop and withdrawn without leaving the building, and there would be no need of floor manouvering that would otherwise be necessary in driving into the repair shop.

Two toilet rooms and a locker comprise the layout in the rear. From the locker room a stairway leads to the boiler room, which occupies a place underneath the machine shop, toilet and locker room.

Ample room for storage is provided in the garage proper. It has been so planned that there are comparatively few columns supporting roof.

At the front of the building will be found the main office with private office and waiting room. A salesroom for accessories and equipment will be found in the corner, having large window areas on both streets. There would be gasoline pumps outside the entrance in the highway.

The structure is of brick, one-story high, with foundations of concrete. The trimmings of the concrete are stone or terra cotta. There is a large wood door on the main street and steel rolling doors on the side elevation. There are also small doors of wood.

Windows are of metal type and of approved design. The roof is of slow burning construction, plank with tar and gravel, supported by steel I beams and C. I. columns of approved design.

A steam wall radiation system is advisable for heating, with pipe or regular radiators. Large skylights are used to give light to the machine shop, repair shop, toilets and locker room.

All floors are of concrete construction. Special attention has been given to provide adequate drainage for the floors in all the departments.

The approximate cost of construction, as shown, would be $12,000.

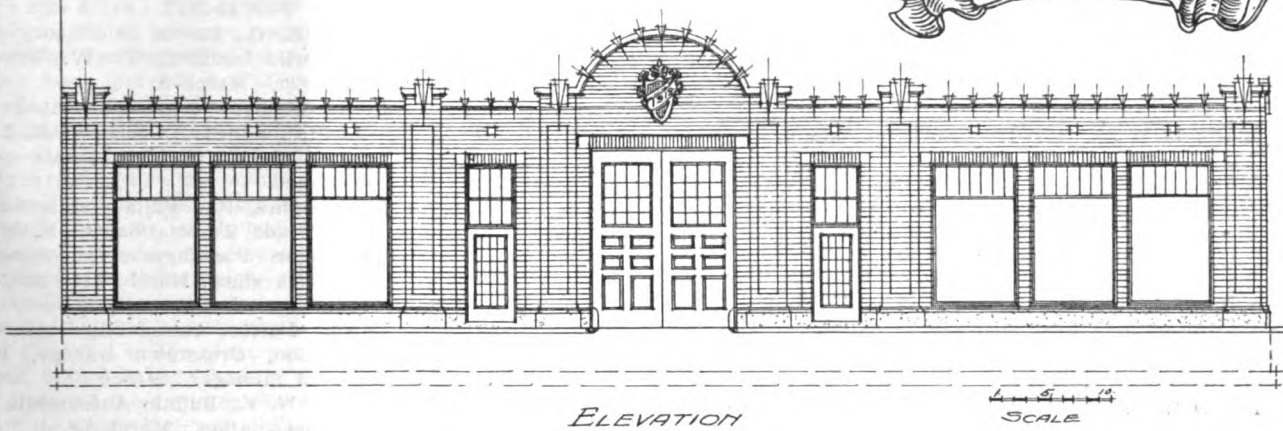
This design presents so many attractive features that the dealer who is planning to erect a motor truck service station will undoubtedly profit by giving attention to its details. The building would present a decidedly attractive appearance, and within there would be practically every convenience that would be necessary or desirable.

Everything is laid out with a view of affording strict efficiency and economy in all operations. Many of the conditions that tend to unnecessary delay and waste of time and labor which are to be found in many service stations, are obviated, and provision is made for handling the trucks in a manner that is bound to bring about successful results.

Any further information in regard to any of the details of construction may be secured by application to this department.

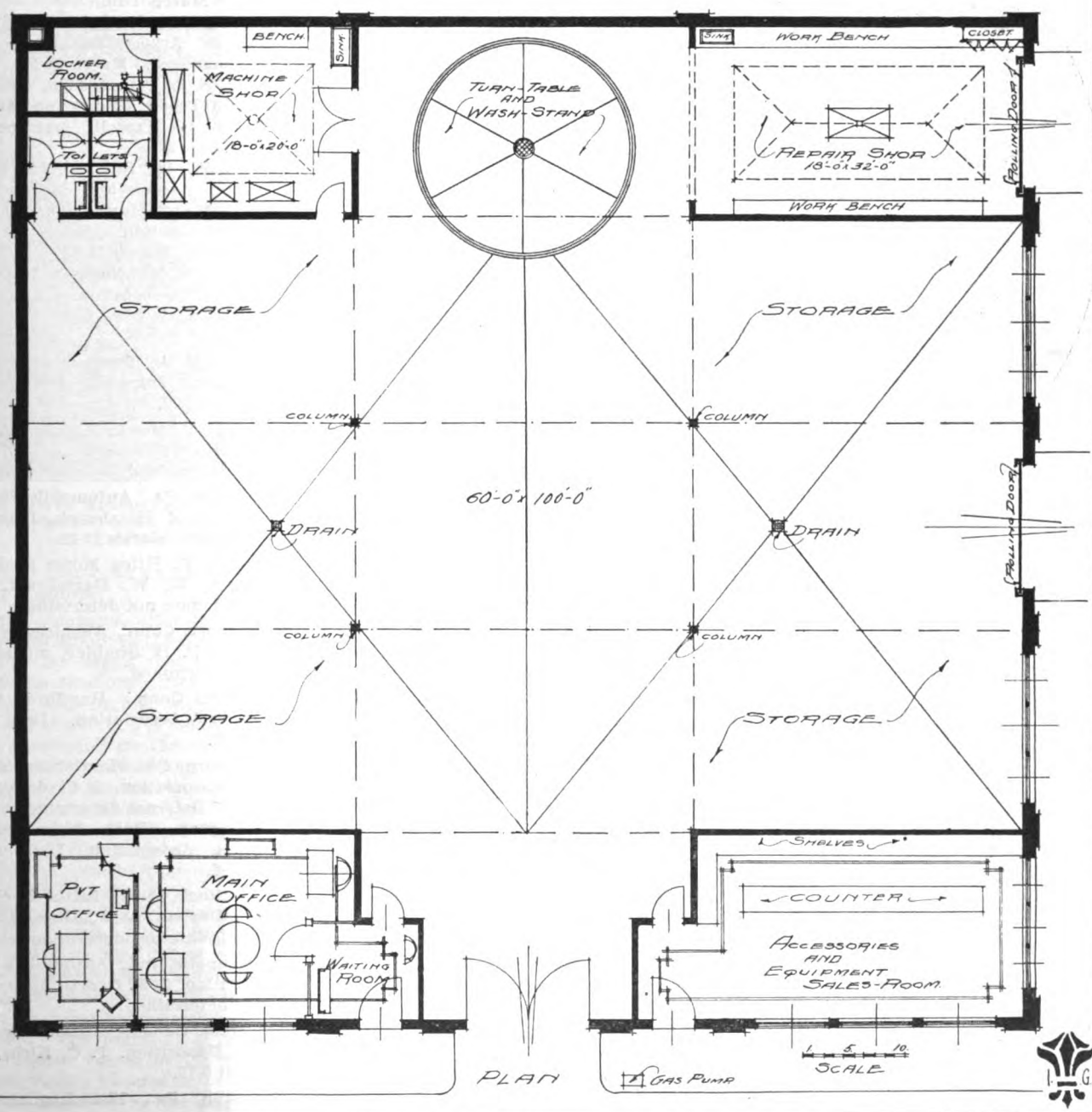
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PLATE XXVI



ELEVATION

SCALE 5 10



PLAN

SCALE 5 10

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BATENBURG RESIGNS AS CHIEF ENGINEER OF F. W. D.

P. J. F. Batenburg has resigned his position with the Four Wheel Drive Auto Co., Clintonville, Wis. He had been associated with the company as chief engineer and designer for the last eight years, having been largely responsible for the phenomenal success and rapid growth of the F. W. D. Co. He insists that he has not as yet made any other connections.

Mr. Batenburg contributed greatly to the Allied cause, and his work was well appreciated by the different governments of the Allied powers. His service was greater than probably is appreciated outside of the war capitals of the Allied countries.

Mr. Batenburg is the designer of the famous F-W-D truck and is well known



P. J. F. Batenburg, Designer of F-W-D Trucks, Who Has Resigned as Chief Engineer of the Four Wheel Drive Auto Co., Clintonville, Wis.

in this country and Europe as one of the most successful truck and tractor engineers of the present time. He is America's first successful four-wheel drive designer, with a wonderful record.

He has a pleasing personality and is known for his keen insight into the future of the truck industry.

LINDEMAN IS FIRESTONE HEAD IN NEW ENGLAND.

C. B. Lindeman and J. E Mayles have been sent from the factory of the Firestone Tire and Rubber Co., Akron, O., to take charge of the New England district. Mayles becomes Boston zone manager and Lindeman will have direct charge of the whole New England district. J. T. Clinton, formerly in charge of the district, has resigned. Edward S. Babcock, factory advertising manager for six years, has resigned to go to the Christian Herald, New York.

The Oldsmobile Co. of Washington, 1202 First avenue, Spokane, is handling the Federal truck.

Truck and Car Shows Determined and Projected

Shreveport, La., Shreveport Automobile Dealers' Association. Jan. 20-25.

Poughkeepsie, N. Y., Poughkeepsie Automobile Club. Jan. 20-25.

Milwaukee, Wis., 11th annual exhibition of the Milwaukee Automobile Dealers, Inc., Auditorium. Bart J. Ruddle, manager, Jan. 24-30.

Chicago, Ill., Cars, Coliseum and Armory, Chicago Automobile Trade Association. Jan. 25-Feb. 1.

Toledo, O., 11th annual show, Terminal Auditorium. Hugo V. Buelow, manager, Jan. 27-Feb. 1.

Chicago, Ill., Trucks, Coliseum, Chicago Trade Association. Feb. 3-6.

New York, N. Y., Cars, Madison Square Garden and 69th Regiment Armory. New York Automobile Dealers' Association. Charles A. Stewart, manager, Hotel Woodward, Broadway and 55th street. Feb. 1-8.

New York, N. Y., Trucks, Madison Square Garden and 69th Regiment Armory, New York Dealers' Association. Charles A. Stewart, manager, Hotel Woodward, Broadway and 55th street. Feb. 10-15.

Fargo, N. D., North Dakota Automobile Dealers' Association, Auditorium. Feb. 5-8.

Rochester, N. Y., Rochester Auto Trade Association, George C. Donahue, manager, Feb. 10-15.

Cleveland, O., Cleveland Automobile Dealers' Association, Wigmore Coliseum. Fred H. Caley, manager. Feb. 15-22.

Albany, N. Y., Albany Automobile Dealers' Association, Armory. Feb. 15-22.

Louisville, Ky., Louisville Auto Dealers' Association, Feb. 17-22.

Newark, N. J., New Jersey Auto Exhibition Co., Claude Holgate, manager. Feb. 15-22.

Minneapolis, Minn., Northwestern Automotive Exposition, Overland building, Walter B. Wilmot, manager. Feb. 15-22.

Des Moines, Ia., 10th annual, Ford building, Des Moines Automobile Dealers' Association, C. G. Van Vliet, manager. Feb. 17-22.

Pittsfield, Mass.; Pittsfield Automobile Show, State Armory, James J. Callahan, manager. Feb. 17-22.

South Bethlehem, Pa., Lehigh Valley Auto Shows Co., J. J. Elliott, manager, passenger cars, Feb. 17-24; trucks, Feb. 24-27.

St. Louis, Mo., St. Louis Auto Manufacturers and Dealers' Association, Robert E. Lee, manager. Feb. 17-22.

Cedar Rapids, Ia., Automobile Dealers' Association, Auditorium. Feb. 23-March 1.

Kansas City, Mo., Kansas City Motor Dealers' Association, E. E. Peake, manager. Feb. 24-March 1.

Springfield, O., Springfield Automobile Dealers' Association, Municipal Auditors' Association, Armory, William F. Daly. Feb. 25-28.

Duluth, Minn., Duluth Automobile Dealtorium. Feb. 24-March 1.

Columbus, O., known as Victory Show, Memorial building, W. W. Freeman, manager. March 3.

Grand Rapids, Mich., Grand Rapids Automobile Business Association, E. T. Conlon, manager. February, date not determined.

Philadelphia, Pa., Philadelphia Automobile Trade Association, A. E. Maltby, manager. Passenger car show followed by truck show, March, date not determined.

Detroit, Detroit Automobile Dealers' Association, Crosstown Garage, H. H. Shuart, manager. March 1-8.

Buffalo, N. Y., Buffalo Automobile Dealers' Association. March 3-8.

San Francisco, Cal., Motor Car Dealers' Association, G. A. Wahlgreen, manager. March 1-10.

Syracuse, N. Y., Syracuse Automobile Dealers' Association, Harry T. Gardner, manager. March 10-15.

Omaha, Neb., 14th annual, Omaha Automobile Trade Association, Auditorium, Clarke G. Powell, manager. March 10-15.

St. Joseph, Ia., St. Joseph's Motor Car Dealers' Association. March 12-19.

Boston, Mass., Boston Automobile Dealers' Association, Chester I. Campbell, manager. March 15-22.

Brooklyn, N. Y., Brooklyn Motor Vehicle Dealers' Association, I. C. Kirkham, manager. March 22-29; trucks, April 1-5.

Trenton, N. J., Trenton Auto Trade Association, John L. Brock, manager, March 17-22.

Great Falls, Mont., Montana Automobile Distributors' Association. March, date not determined.

Pittsburgh, Pa., Automobile Dealers' Association of Pittsburgh, John J. Bell, manager. March 22-29.

Utica, N. Y., Utica Motor Dealers' Association, W. W. Garrabrant, manager. March, date not determined.

Bridgeport, Conn., Auspices of City Battalion, B. B. Steibler, manager. Date not determined.

Hartford, Conn., Hartford Automobile Dealers' Association. Date not determined.

Harrisburg, Pa., Harrisburg Motor Dealers' Association, J. Clyde Myton, manager. Date not determined.

Wilmington, Del., Wilmington Motor Trade Association. Date not determined.

Little Rock, Ark.; Little Rock Automobile Dealers' Association, Liberty Hall. April, date not determined.

Indianapolis, Ind., Automobile Trade Association, J. B. Orman, manager. Date not determined.

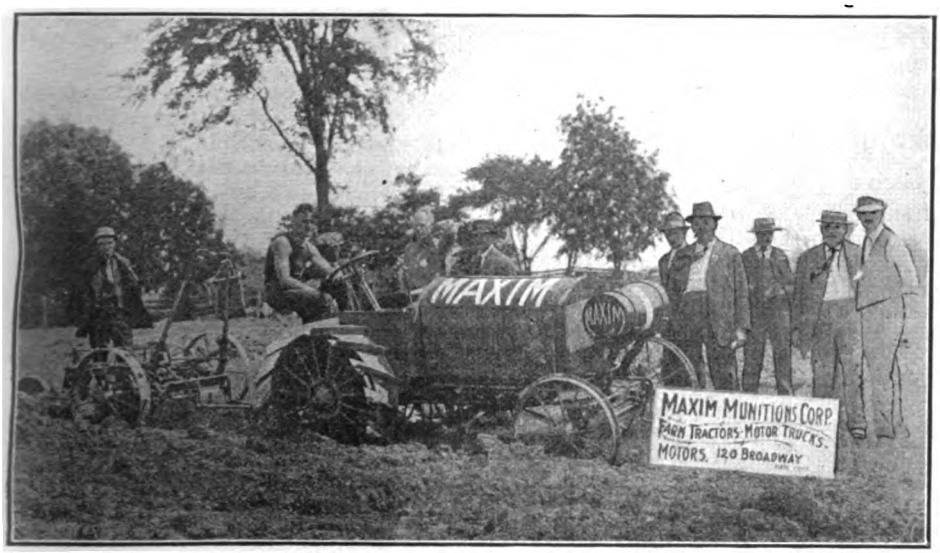
Montreal, Canada, Automobile and Used Car Exposition, T. C. Kirby, manager. April 5-12.

Scranton, Pa., 13th Regiment Armory. Date not determined.

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THE MAXIM WORM-DRIVEN FARM TRACTOR

THE most distinctive feature in the design of the Maxim tractor is the worm drive. This method of final drive was adopted because, according to the manufacturer, extended tests and experience have proved that it was the most efficient means of applying power for the constant pull required in a farm tractor. Compact design and a low center of gravity add to the stability of the tractor and reduce the danger of tipping over when working on hillsides or on very uneven ground. The tractor frame is suspended on three points, the front being connected through a swivel joint to a transverse half-elliptic spring, which in turn is shackled to the front axle. Two brackets, bolted to the frame of the tractor in front of the radiator, form a support for the main fuel tank. This has a capacity of 15 gallons. The gasoline tank, which holds but one gallon, this being used only for starting, is on the inside of the metal wall that runs on each side of the driver's platform.



The Worm Driven Maxim Farm Tractor During One of the Frequent Demonstrations Given Prospective Buyers at the Westchester County Estate of the Maxim Munitions Corporation, Near New York City.

The Maxim company, after trying out several engines finally decided to design its own, with the result that it is now using in Maxim tractors a four-cylinder, four-cycle, L head engine, with bore of 4¼ inches and stroke of 5½ inches. It is three-point suspended on the frame. Its normal speed is 900 revolutions per minute. The cylinders are cast in block and the cylinder head is detachable. The crankshaft has three bearings, which are 2⅝, 2 3/16 and 2 1/16 inches diameter respectively. The camshaft is driven by helical gear and has also three bearings. Mobile "B" oil is the grade recommended for use in this engine. The cylinder displacement is 312 inches. When running on gasoline the compression is 70 pounds and on kerosene 50 pounds. Different cylinder heads are used for operation under the two fuels. The diameter of the intake and exhaust valves is 1⅞ inches. The flywheel weighs 45 pounds.

The power delivered by the engine is said to be considerably greater than the figures at which it is rated, which are 12 horsepower at drawbar and 24 horsepower at pulley. The surplus power takes care of sudden excessive loads and the tractor has capacity for all plowing work.

A 1¼ inch Holley carburetor, a Bennett air cleaner and a kerosene vaporizer of special design in combination provide the engine with a suitable combustion mixture for the cylinders. A Dixie high-tension magneto with an impulse starter is used. Oiling is through a circulating pump and splash system.

To control the speed of the engine a specially designed governor is installed which governs the speed according to the turning of the throttle lever on the quadrant.

A Perfex cellular radiator and a fan encased in a housing, together with water which is kept in circulation by a pump, keep the engine at the safe temperature. The fan is 20 inches in diameter and is mounted on ball bearings.

The engine and the transmission are assembled as a unit, the transmission being of the selective type with cut and hardened gears running in oil and on Hyatt roller bearings. The differential is the four-pinion bevel type and operates on Timken roller bearings. This make of roller bearings is also used on the front and rear axle. The pulley drive, however, is equipped with ball bearings. A modified Borg and Beck disk clutch is included in the transmission system.

The front axle is a semi-steel casting of standard design. The rear axle is the full floating type and runs entirely in oil. The front wheels are 30 inches diameter, with four-inch faces and with angle steel flanges in the center. The rear wheels are 40 inches high with 10-inch faces, and are equipped with angle lugs or spuds. Steering is through the action of a worm and worm gear, which are inclosed. The ignition and throttle controls are on the steering column. Three levers control the operation of the tractor, a foot clutch lever, a foot brake lever and the gear shift lever. The frame is a rigid channel section. On the dash are the switch and lubricating oil indicators. The driver's platform is seasoned wood supported by a steel frame. The half elliptic front spring has five leaves. Internal expanding type brakes are used. There are two, one for each wheel, which can be operated singly or together. The seat, which is pressed steel mounted on flat bar springs, which can be swung out of position when not in use. The belt pulley is eight inches diameter, with eight-inch face, and is mounted on Hyatt roller bearings and runs at engine speed. The wheel guards or fenders are of heavy gage steel.

The tractor is 118 inches long overall, 63 inches wide and 54 inches high. It has a wheelbase of 78 inches and a ground clearance of 10 inches. Its weight is 3865 pounds and it can be turned in a 21 foot circle.

The compact construction of the Maxim tractor and the fact that all the working parts are inclosed, makes for long life and low cost of maintenance and repair.

The company plans to distribute through dealers so as to place a dealer with his service station, stock of repair parts and other facilities within easy reach of every owner. A demonstrating farm has been established within a short distance of New York City, where there is full equipment for general demonstration. It is planned to have exhibitions there at stated times and to them will be invited farmers and others interested in farm tractors. Two years were spent in studying, developing, testing and demonstrating the Maxim tractor, both in the factory and in the field, until the designers are satisfied that they are now building a product of such quality that will stand up under the severe usage which it will receive in farm work.

HOBSON MAKES NEW CONNECTION.

Norman S. Hobson, who was commissioned a second lieutenant of artillery and later attached to the air service as artillery observer, will handle the sale of the products of the Connecticut Telephone and Telegraph Co., Meriden, Conn., in New England and upper New York state. Before entering the army he was agent in Fairfield county, Conn., for Saxon, Jordan and Scripps-Booth cars.

NEW GENERAL TIRE DISTRICT MANAGERS.

A. M. Whaley, formerly southern district manager for the Kelly-Springfield Tire Co., has been appointed southern sales manager for the General Tire and Rubber Co. of Akron, and will maintain headquarters at Atlanta. Thomas L. Moore, appointed southwestern district manager for the General Tire and Rubber Co., will have headquarters at Dallas.

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INDUSTRY WILL BOOM, SAYS W. L. KISSEL.

W. L. Kissel, secretary and treasurer of the Kissel Motor Car Co., is confident that the automobile industry will boom this year. "The car proved the utility of this 20th century carrier," he says. "Its ability to meet emergency tests in war time will give it the right of way in peace time. This proven efficiency and economy has made the purchase of automobiles a strictly business proposition, just as the purchase of any other time or labor saving utility. The purchaser is buying transportation—so many miles of economical and comfortable travel—a commodity he must have in order to keep up with the present times."

LARGEST LABOR EMPLOYER IN DETROIT IS PACKARD CO.

The 1918 industrial census by the Michigan Department of Labor shows that the largest employer in Detroit is the Packard Motor Car Co., with a total of 10,781 men and women. The Cadillac Motor Car Co. comes second, with 9120 meu and 184 women. The Fisher Body Co. ranks third, with 6948 men and women, more than three times greater than the previous year.

The report is of March 31, 1918. The period of time covered runs into a series of changing conditions, covering the wider employment of women and the conversion of factories from peace or semi-war output to a 100 per cent. war basis.

The report fails to cover several of the largest and most important plants, such as the Ford Motor Co., Maxwell Motor Co., the Russell Motor Axle Co. and others. The figures of some of the Detroit industries follow with comparisons for the previous year:

Name of Company	Product	Employees 1918 Male	Female	Employees 1917 Male	Female
Acason Motor Truck Co.	Trucks	75	4	17	..
Bower Roller Bearing Co.	Bearings	328	3	244	..
Clayton & Lambert Mfg. Co.	Sheet metal	225	32	525	121
Commerce Motor Co.	Trucks	138	3	61	..
Continental Motors Corp.	Motors	3,433	64	2,089	63
Denby Motor Truck Co.	Trucks	119	14	117	6
Detroit Lubricator Co.	Brass Goods	855	50	867	37
Disco Electric Starter Co.	Starters	104	2	52	12
Federal Motor Truck Co.	Trucks	480	40	325	29
Golden, Belknap & Swartz Co.	Motors	125	5	81	5
Signal Motor Truck Co.	Trucks	82	7	58	4
Timken-Detroit Axle Co.	Axles	4,604	100	4,324	61
J. C. Wilson Co.	Trucks	94	9	84	7

VELIE COMPLETES ALL WAR CONTRACTS.

All war contracts have been completed by the Velie Motor Corporation, Moline, Ill., after four years of activity, begun in 1914, when representatives of the French government placed with it orders for 2000 motor trucks. One thousand more were sent to the Mexican border in 1916 for the use of United States troops. When the United States entered the war many thousand more trucks were ordered.

The company supplied 3000 Liberty trucks, and later an order was received for 1000 ¾-ton trucks. Trailers were also manufactured for the heavy trucks.

Twenty-five thousand small carts for carrying machine guns to their emplacements and to handle ammunition and other supplies were also turned out by the company. The order for carts alone aggregated $3,000,000. The total of contracts handled during the war amounted to $10,000,000, but this does not include the contracts handled prior to the entrance of the United States into the world war.

The plant is now being operated on a peace basis.

FORD GETS NAME REGISTERED ON AUTO TIRE.

Henry Ford has succeeded in registering the name "Ford" for a tire. The Examiner of Trade Marks rejected the application on the ground that "Ford" was merely the name of an individual. Henry Ford appealed this and the Commissioner of Patents held that the word "Ford" was an index of a reputation and a mark of origin. Besides being a personal victory for Ford, it means that no one else can bring out a "Ford" tire.

DETROIT WEATHERPROOF CABS FOR TRUCK CHASSIS.

Detroit weatherproof cabs for motor trucks have many features that are bound to make a strong appeal to the driver of a truck. They may be completely enclosed during stormy weather or converted in a very short time into open cabs. They keep out snow, rain and bitter cold winds, yet allow the driver to signal traffic with his hands.

These cabs also appeal to the truck owner, as he realizes that his driver will be a more efficient worker if properly protected from the frigid weather, and that the chauffeur will keep the truck more steadily in operation if the cab is weatherproof.

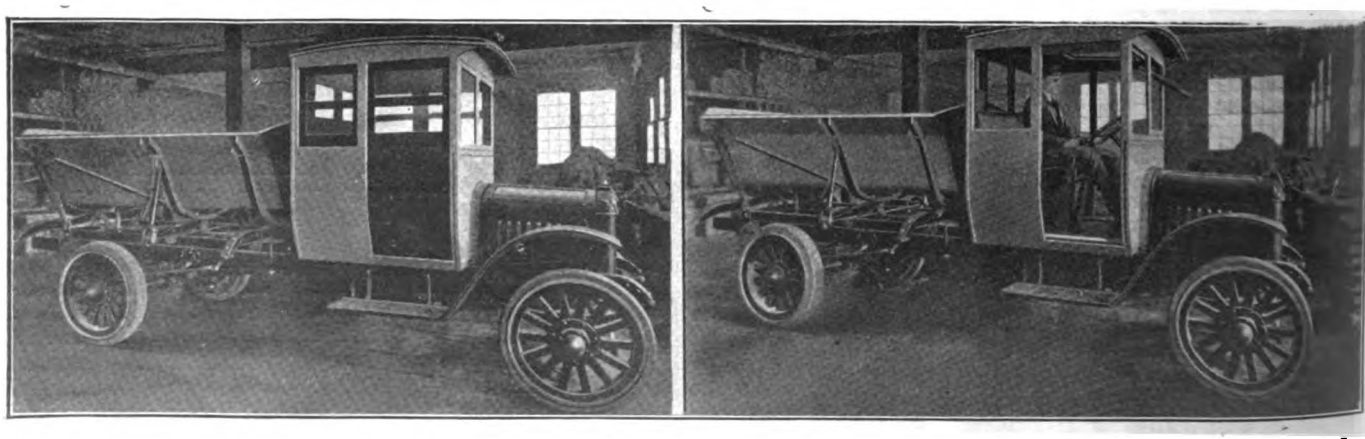
Truck manufacturers, too, have taken the truck drivers into consideration, and each year an ever increasing number of trucks is being equipped with weatherproof cabs as standard equipment.

Detroit "Weatherproof Cabs" are constructed of wood and heavy gauge metal, insuring strength and light weight. They are equipped with light, strong, patented doors that slide into the tops where they are out of the way when not in use. The doors are so fitted that they do not rattle. The windows are constructed to slide upward, permitting the driver to peer out or signal traffic.

The windshields are divided into two sections. The section directly in front of the driver may be opened, allowing the other section to remain closed. There is plenty of seat and leg room. The upholstery is comfortable and atractive.

The doors and windows are the most distinctive features. The window and door frames are made of spring steel, covered with leather, and slide in deep metal channels, serving the double function of guides and weather strips. Spring steel is used to permit the door frames to follow the radius of the channels into the top deck of the cab. When open the doors lie flat in the deck overhead and cannot rattle or break. The windows drop down in metal channels into the body of the cab.

J. F. Bowman has succeeded S. M. Williams as sales manager of the Garford Motor Truck Co., Lima, O. Mr. Williams has taken charge of the company's new highway development department.

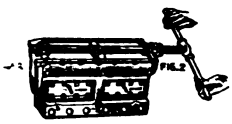


Truck Chassis Cabs Built by the Detroit Weatherproof Body Co., That at the Left Showing the Doors and Windows Open and That at the Right the Cab Fully Open for Summer and Pleasant Day Work.

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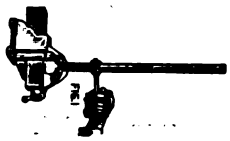
The Main Bearing and Connecting Rod Aligning Reamer is a high grade tool for Ford repair shops. It is operated easily with one hand and cuts absolutely smooth without chatter. Spaces between reamers and pilots ground five thousandths undersize. Simply file off front and rear bearing caps to fit snugly on pilots when main bearing bolts are drawn up tight, then ream; this will align both end bearings and touch high spots of center bearing, which is the one invariably out of line. Then repeat the operation, taking off less metal from the first and third cap and with all three bearing caps in place, ream



to a finish. The job will be perfect and takes about 15 minutes as against half a day by hand scraping. It is also used to ream the connecting rods. One hour will cover all the time required to fit all engine bearings.

Fig. 2 shows the reamer in position, reaming the first and third bearings to get them down to match, which is the one invariably low. As soon as all three bearings are in alignment cut through with all three caps in position and the job is done.

If the crankshaft is slightly undersize simply file off the caps a little after they

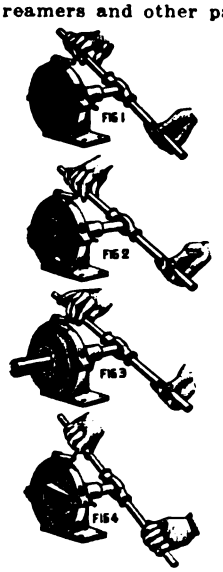


have been reamed and fitted; then put the crankshaft in place. Two or three light taps with the hammer will shape the bearing cap to perfect fit so that crankshaft will spot the entire length and width of bearings.

Fig. 1 shows the position of the reamer in fitting up connecting rod bearings, which are of the same size as main bearings.

Manufactured by K. R. Wilson, 10-16 Lock St., Buffalo, N. Y. Price, $28. A 24-inch tap wrench is included for use with same.

The Transmission Bushing Reaming Machine for Ford repair shops enables a person to completely remanufacture a transmission in a short time. All these reamers are especially designed with spiral flutes and do practically all their cutting on the point of the reamer; the flutes serve to give final, velvety finish by scraping slightly. Average time to insert, ream and take out the drum is two minutes each. All reamers and other parts of this



machine are made from the finest material. The figures show the way each drum is set up in the machine and held perfectly rigid and in alignment with reamers.

Fig. 1 shows reaming a reverse transmission drum bushing, using No. 3 arbor with No. 4 reamer.

Fig. 2 shows reaming the slow speed drum bushing, using the reamer and arbor.

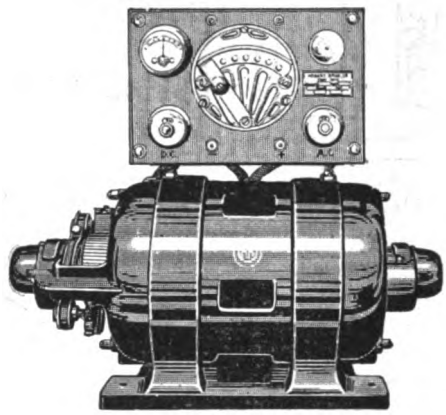
Fig. 3 shows reaming transmission brake drum bushing, using No. 5 combination arbor and reamer.

Fig. 4 shows reaming a triple gear bushing, using a No. 6 reamer and arbor with special clamp No. 8. The small end of triple gear just fits in the recess, holding squarely against the shoulder of the center gear.

Manufactured by K. R. Wilson, 10-16 Lock St., Buffalo, N. Y. Price, complete with all attachments and improvements, $68.

The HB Battery Charging Set connects a motor operating from a direct or alternating city current, mounted on the same shaft with a generator specially designed for charging auto starting and lighting batteries. Ball bearings support the motor generator shaft at each end.

The charging system includes a switchboard and is ready to operate by connecting the city current circuit to the upper binding posts. After making these connections the switch at the right controls the motor. The current for charging is delivered through the lower binding posts



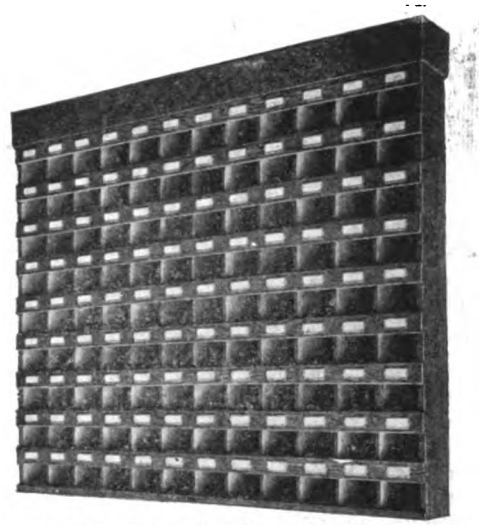
and is controlled by the switch on the left. This current may be regulated by moving the handle of the rheostat in the middle of the board. An ammeter shows the flow of current through the battery terminals.

Automatic voltage control in the generator permits the charging of different voltage batteries at the same time. If batteries are connected up wrong, the negative pole of the battery to the positive terminal of the machine, the generator will protect the batteries by reversing its polarity.

Manufactured by Hobart Bros. Co., Troy, O. Price $195. Sold on terms of $15 cash and 9 payments of $20 per month.

NOTE—This article with corrections and revised prices has been reprinted owing to errors made in connection with the previous description.

The HB Stock and Accessory B'n. Garage men have long felt the need for a convenient and economical equipment for handling stocks of valves, bolts, piston rings, bearings, grease cups, hose clamps and miscellaneous repair parts and supplies. The HB Stock and Accessory Bin, illustrated herewith, meets this demand. While this bin costs less, it is more attractive in appearance and is better built than the average built in equipment. The front partition and ends of the bin are genuine oak with light grained finish. The back is of sheet steel. It contains 108 compartments, five inches wide, five inches high and eight inches deep, each compart-



ment bearing a metal card holder for indexing its contents. It is an attractive, serviceable and economical equipment, keeping stock where it is always easy to find.

Manufactured by the Hobart Brothers Co., Troy, O. Price, $38.40.

NOTE—This article with corrections and revised prices has been reprinted owing to errors made in connection with the previous description.

The Perfection Battery Connector eliminates the use of thumb nuts and can be slipped on and off a binding post in a second's time. There is no bother, no trouble.

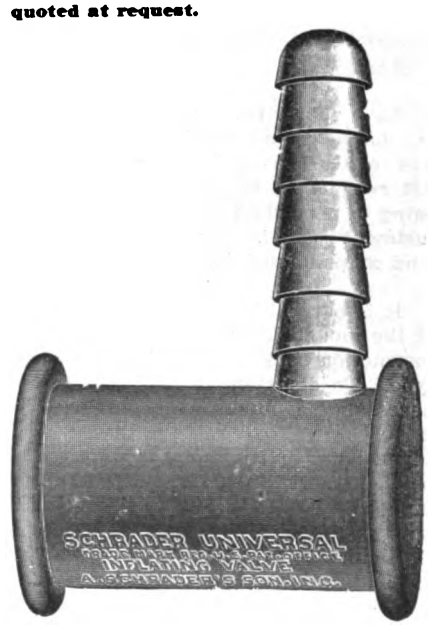


As there is nothing to give out, nothing to wear, the connector should last a lifetime.

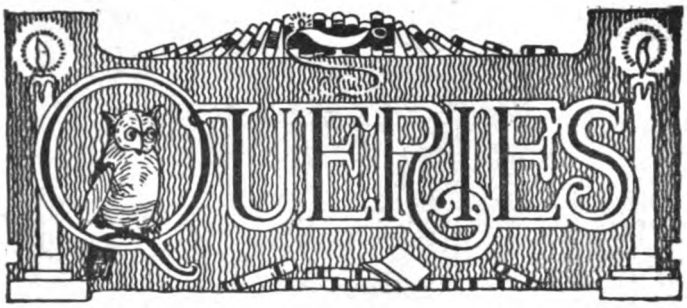
Manufactured by the Fitzgerald Mfg. Co., Torrington, Conn. Price per dozen, 70 cents; per 100, $5; per 1000, $30. Write for discount.

The Schrader Automatic Inflating Valve makes the bottled air lock itself into the tank. When filling the tire the valve is pressed against the valve stem and when the desired pressure is obtained the removal of the valve automatically cuts off all air leakage from the tank. It is made to fit any diameter of hose from ¼ inch to ⅝ inch.

Manufactured by A. Schrader's Son, Inc., 800 Atlantic Ave., Brooklyn, N. Y. Price quoted at request.



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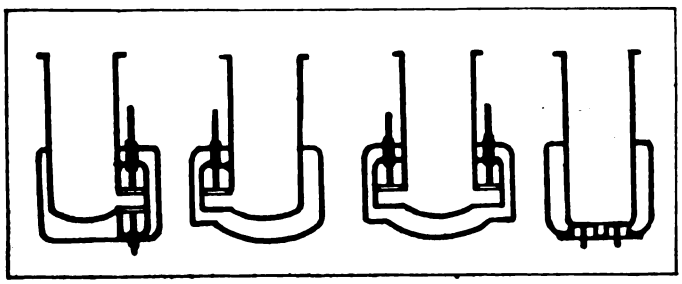


MEANING OF CYLINDER SHAPES.

(C. B. M., Bristol, Conn.)

What do manufacturers of automobiles mean when they speak of L head, T head or I head motors? I do not own or run an automobile, but lately have become interested in them. While looking over catalogue I have frequently seen reference to the expressions I mentioned before.

The terms L head, T head or I head refer to the shape of the cylinders in a motor car engine, that is cylinders which roughly conform to the letters L, T or I. The terms are also indicative of the locations of the valves in each type mentioned. In the L head type the valves are generally all on



Shapes of Cylinders, Reading Left to Right: I Head, T Head, L Head and Special L Head with Valves in Head and Side.

one side, either right or left, or some times they are both in the head and on one side. In the T head engine the inlet valves are located on one side, while the exhaust valves are on the opposite side of the cylinder. In the I head the valves are located in the head of the cylinder.

An analysis of the specifications for 1919 models, covering some 200 or more models, shows that about 68 per cent. of them are provided with L head cylinders, about nine per cent. with T head types, about 11 per cent. with I head, while the balance, or 12 per cent., have V shaped engine blocks in which L head type cylinders predominate.

WANTS TO DISASSEMBLE REAR.

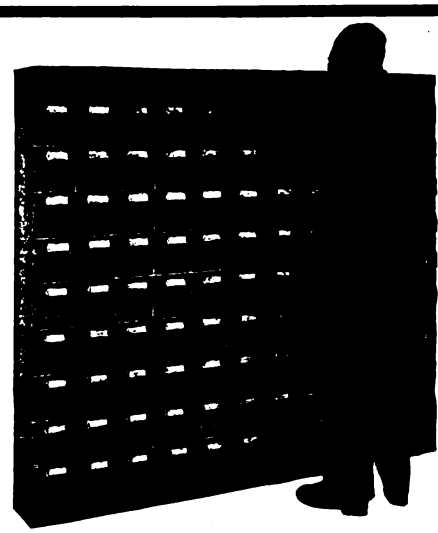
(G. L., Kinerside, R. I.)

As a subscriber I would like to ask if you could publish in your next issue of the Automobile Journal a drawing relative to the disassembling of a semi-floating type of axle. The left rear wheel of my car is very hard to turn by hand and being of a mechanical turn of mind, I wish to make this adjustment myself. The style of car which I refer to is an Oakland coupe, model 42.

It is our belief that you are in error in regard to the axle of the model 42 Oakland being of the semi-floating type, the instruction book showing it to be of the three-quarter floating type. To disassemble this type of rear axle it will first be necessary to "break" the universal joints and remove the drive shaft. Next remove the bevel pinion by loosening the seven bolts in front of the differential housing. Loosen the bolts in the hub driving flanges and draw out both axle driving shafts. The differential mechanism can now be taken out by loosening the bolts and removing the front plate from the housing. This plate is termed the differential carrier, since it retains the differential mechanism in two bearings.

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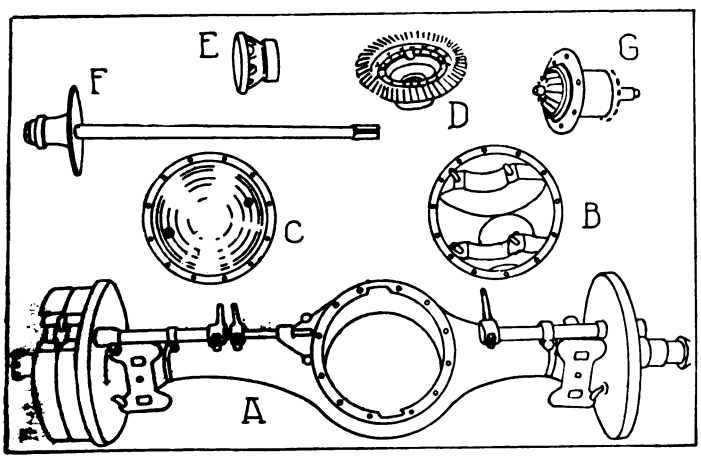
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Several Members of the Rear Axle Group of the Model 42 Oakland—A, Differential Housing; B, Differential Carrier; C, Gear Case Cover; D, Bevel Ring Gear; E, Differential Bearing; F, Axle Shaft; G, Bevel Pinion.

A view of a disassembled rear axle group of the model 42 Oakland is shown in the accompanying illustration.

It is difficult to publish in such limited space every step necessary for the overhauling of the rear construction, but we are, however, the publishers of a book entitled "Motor Car Operation," which fully illustrates and explains the steps necessary to be taken.

The setting of the differential is work for an expert and if the car affords satisfactory road service it is not advisable to disturb the rear construction for such a small trouble.

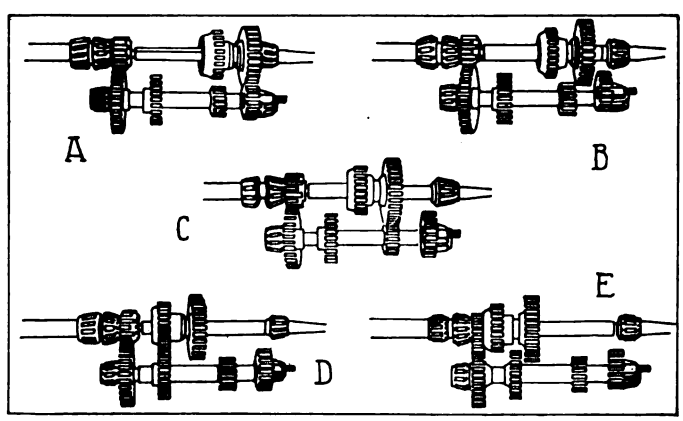
OPERATION OF PROGRESSIVE TRANSMISSION.

(C. G., Portland, Me.)

Being a subscriber to your magazine, I would like you to explain the operation of the progressive type of transmission. Starting from neutral, is it necessary to engage every gear before high can be reached?

The progressive type of transmission is as the name would indicate, one which advances the gear ratios only in the order of their rotation. If the gear shifting lever was in the neutral position it would be impossible to engage the high speed without engaging the low and intermediate speed gears first. This is often referred to as running through the gears.

In this type of transmission there are three shafts, the clutch shaft which extends through the front of the case and on the outer end of which is mounted the clutch; the main shaft which is in line with the clutch shaft and which extends through the rear of the case and transmits the power to the drive shaft; and the counter shaft, which is usually located below the main shaft. The speed reductions are



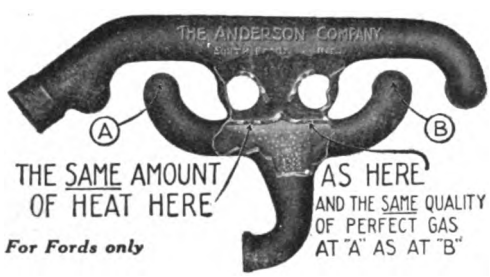
Arrangement of Gears in Progressive Transmission: A, Reverse Gear Meshed; B, Gears in Neutral Position; C, Low Gear Engaged; D, Intermediate Gear Meshed; E, High Gear Affords Direct Drive from Engine.

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made by the different sizes of gears which are firmly attached to the counter shaft. On the square main shaft are two gears of different size, which are slid along by the action of the gear shifting lever.

The power from the engine is transmitted through the clutch shaft to the first gear on the counter shaft. The gear on the clutch shaft and the first gear on the counter shaft are always in mesh and are therefore termed the permanently meshed gears. From the counter shaft the power is transmitted through the sliding gears to the main or square shaft. From this shaft the power is transmitted through the driving shaft to the rear axle and to the wheels. When the car is traveling in high speed the main shaft is coupled directly to the clutch shaft. This is accomplished by an internal gear in the sliding assembly meshing with the gear attached to the clutch shaft. Although the counter shaft is in mesh and turning, no power is transmitted through it.

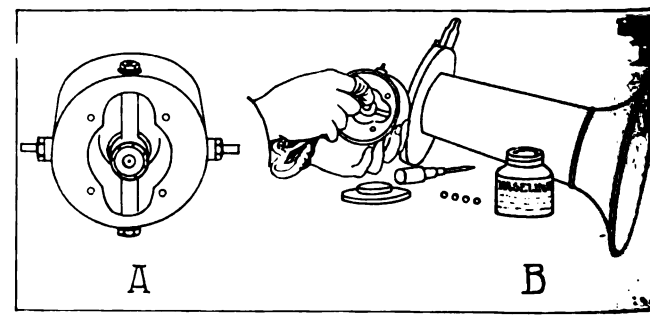
The accompanying illustration shows the positions of the gears for producing the different speeds.

CARE OF ELECTRIC HORN.

(W. F. M., Boston, Mass.)

Kindly give me full instruction for cleaning and lubricating my Klaxon electric horn and Stewart speedometer.

The Klaxon electric horn is designed to operate in connection with a six or eight-volt storage battery, or six or eight dry cells. At different times test the battery to determine that the horn is being supplied with the proper amount of current. The volt meter should register not less than 5.5 volts. Once a week two drops of cylinder oil should be dropped into the oiler on the back of the horn. Once every month clean and lubricate the commutator, which can be reached by removing the four screws in the bottom of the motor case and taking off the cover. The accompanying illustration, A, shows the commutator after the bottom of the motor case has been removed. With a dry cloth wipe it clean, after which apply a little vaseline to a clean part of the cloth and smear a slight film, as shown at B. If regularly cleaned and lubricated, the Klaxon will operate indefinitely without adjustment.



A, Cover Removed, Disclosing Commutator of Klaxon Electric Horn; B, Smear Commutator with Slight Film of Vaseline.

Under no condition should you attempt to lubricate the speedometer head, as any parts requiring lubrication were attended to when the instrument was assembled. The manufacturer of this instrument furnishes a special lubricant for the shaft. This is to be placed in boiling water, so that it will be soft enough to run. The shaft should then be held in a vertical position, and the oil poured in. When cool it forms a plastic cushion of soft grease around the chain, insuring quiet and frictionless operation.

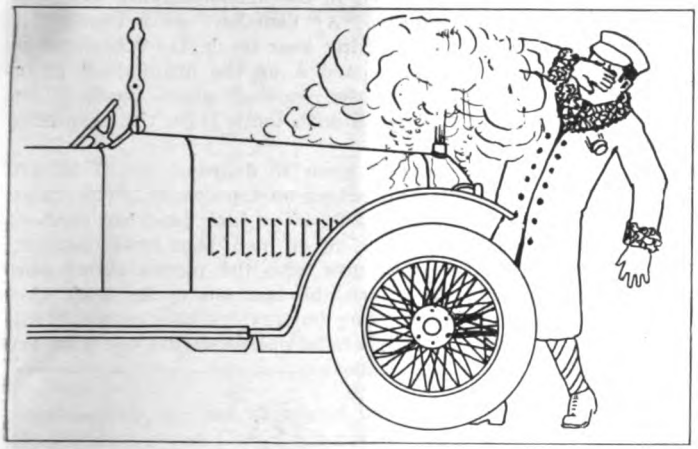
The swivel joint should be lubricated once a week. A grease cup is provided and should be filled with hard grease. Each day a turn should be given to the grease cup so as to force its contents into the joint. Unless this precaution is taken, swivel joint trouble is inevitable.

CARE OF OVERHEATED MOTORS.

Much space has been allotted to the subject of the causes of an overheated motor. No doubt the first symptom apparent to the operator that the motor is overheated is the ap-

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pearance of steam working out around the threads of the radiator filler cap. The only other exit for the steam is through the overflow pipe. Because the latter is the only free passage for the steam, when it is seen escaping from the radiator cap, it is proof that it is being forced out by pressure. One of the commonest mistakes made by the new, as well as many experienced drivers, is to unscrew the radiator cap and peer into the radiator—often to his keen regret. If there is water in the radiator and sufficient steam has been developed, the instant the radiator filler cap is removed, the escaping steam will cause a minute geyser of scalding hot water to spout several feet in the air. An example of this is shown in the accompanying illustration.



When Filler Cap Is Promptly Removed from Radiator of Overheated Car Scalding Hot Water Is Apt to Spout Into the Operator's Face.

This condition will not always be experienced, as many times when the cap is removed, only steam will escape. It may be that all of the water has boiled away.

It is poor practise to cool the motor by promptly pouring cold water into the radiator. Metal which is very hot and which is suddenly cooled is apt to crack. When the motor is overheated the better policy is to raise the hood and allow the engine to cool for two or three minutes. The radiator cap can then be removed with safety.

REPAIRING CRACKED WATER JACKET.

If an anti-freezing solution is not used and the car is exposed to extremely low temperatures, a crack is apt to develop in the outer wall of the cylinder water jacket. Of course the most workmanlike repair is to have the part welded by the autogenous process. If such equipment is not available, a satisfactory repair can be made by the use of a few copper chippings and a blow torch.

It is necessary first to prevent the crack from spreading. This can be accomplished by drilling and tapping a small hole at each end of the flaw. After graphiting the threads, insert small studs in the holes. Next thoroughly scrape and clean the area around the fraction and apply a liberal amount of soldering flux to the crack.

From a piece of soft copper cut a number of small chips and place them over the crack and direct the flame from the blow torch on them. The copper will quickly liquidize and flow into the fracture. It is imperative that the crack be as clean as possible. Any superfluous metal can, of course, be scraped off after the repair.

REMOVING RUSTED NUTS.

Nothing is more stubborn than a nut which has become rusted onto the bolt. Many times it can be removed by soaking kerosene around the threads. Another method is to direct the flame from a blow torch on to the nut. Heat the nut, but not the bolt. The heat will cause the metal to expand and it then can be loosened by tapping lightly with a hammer.



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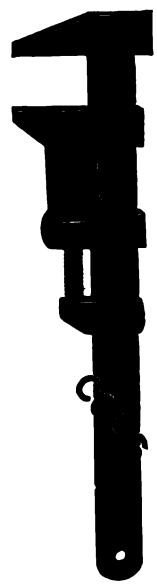
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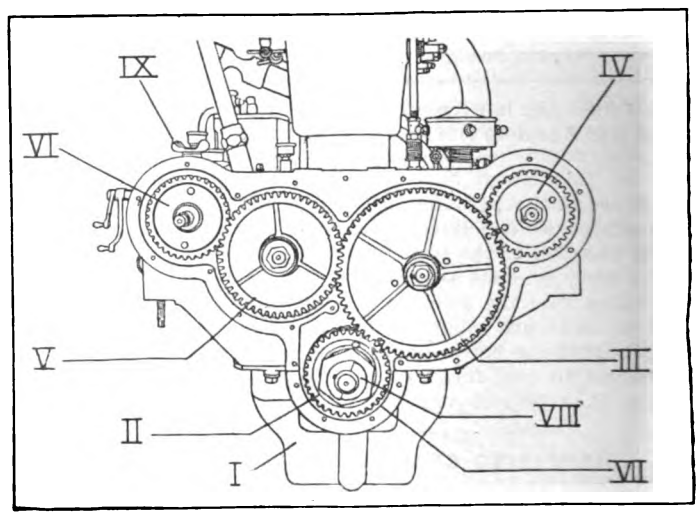
TIMING AN OLD POPE-HARTFORD MOTOR.

(J. H. B., Syracuse, N. Y.)

I have been taking your journal for the last two years and find it a big help in many ways. I have an old Pope-Hartford motor in my car, model T, 1909, which I have rebuilt. The cylinders have been rebored from 4 5/16 to 4⅜ inches. It has a 5⅛-inch stroke and racing pistons. It also has a new crankshaft and connecting rod bearings. Now what I wish to know is how to time the valves to get the most speed possible?

There is only one way of setting these valves and this is controlled by the timing gears. All model T engines have the timing gears marked as shown in the accompanying illustration: Crankshaft gear space, A; camshaft gear tooth, B; space, C, and the magneto driving gear tooth, D. When these gears are properly meshed, space A on the crankshaft gear should mesh with tooth B on the camshaft gear. Space C on the camshaft gear should mesh with tooth D on the magneto driving gear.

The exhaust valve should open 35 degrees, or .37 of an inch, before lower center and close on top center. The inlet valve opens at 10 degrees, or 3/64 of an inch past top center, and closes at 30 degrees, or .27 of an inch, past lower center. The engine should be set to fire with the piston about one inch down from top center on the ignition cycle, with the spark fully retarded when using battery ignition only. With magneto ignition the position of the piston should be ⅛ of an inch down from top center on the ignition cycle with the spark lever fully retarded. There should also be 1/32 of an inch clearance between the valve stem and the rocker arm when the valve is closed.



Showing Timing Gears of Model T, Pope-Hartford Motor—I, Crank Case Bottom Cover; II, Crankshaft Gear; III, Camshaft Gear; IV, Magneto Driving Gear; V, Water Pump Idler Gear; VI, Water Pump Driving Gear; VII, Lower Section Gear Case Cover; VIII, Starting Ratchet; IX, Gear Case Oil Hole Plug.

To determine that the valve is properly set, put a piece of thin, tough paper between the top of the exhaust valve stem and the valve operating lever. Turn the flywheel slowly until the exhaust valve opens and closes sufficiently to allow the paper to be drawn without tearing.

Then remove the inlet valve of the same cylinder. Pass a rod about ¼ inch diameter and 18 inches long down through until the end rests on the top of the piston. On this rod make a mark even with the top of the cylinder. Turn the flywheel slowly in the same direction as before and the piston should only rise 1/32 of an inch more to prove that the valve is set correctly. If it is not properly set, the easiest way to correct it is to remove the brass idler gear in the aluminum case in front and turn the camshaft gear one or more teeth until the exhaust valve closes as above described.

When one exhaust valve is correctly set, all other valves, both inlet and exhaust, will be correctly timed.

If a greater speed is desired, it should be obtained by changing the gear ratios and not by attempting to alter the timing of the motor.

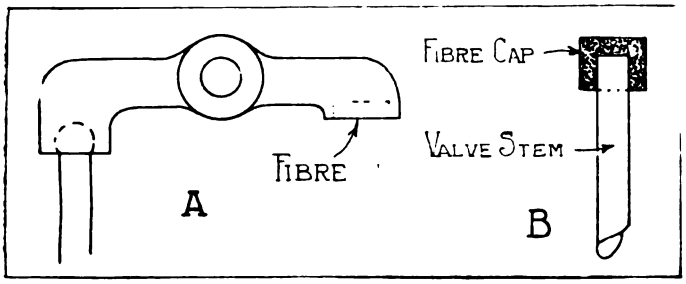
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FIBER ROLLS FOR SILENT OPERATION.

(E. B. McC., Glen Ridge, N. J.)

I have a D-Six-45 1916 Buick car. Please inform me where I can buy fiber tips for silencing the overhead valves. I understand such tips are made, but I am unable to find any concern that sells them. In your Nov. 25 number you mention fiber rollers, which is the principle to which I refer, but these would not fit a 1916 Buick car.

Fitting fiber valve tips to a Buick car is an almost impossible job, so far as insuring satisfaction is concerned. The writer has, however, seen fittings made that have been reasonably efficient. As will be noted, these are comparatively



Methods of Fitting Fiber Rolls to Obtain Silent Operation of Valves.

simple. The method indicated as A consisted of drilling a hole of the desired size in the contact end of each valve lever to the depth of a sheet of fiber. A series of discs approximately .002 inch larger in diameter than the drilled hole were punched from the fiber sheet, and these were hammered into the drilled holes in the levers, filling them even. These fiber discs silenced the valves and could be renewed as often as worn. The method indicated as B on the accompanying sketch was simply turning a series of fiber caps from block fiber to dimensions so that they snugly fitted the valve rods or stems. Of course these wore, but they could be easily replaced. Fiber can be obtained in sheet or block at any large hardware store or mill supply house. Can't you eliminate the noise by adjusting the valve push rods?

SHARPENING DULL FILES.

A file that has become useless through the space between its teeth being choked with metal and oil can be made serviceable again by washing. First wash them thoroughly with warm water and then place in a wooden vessel in which is a solution of about a quart of warm water, three ounces of borax and an equal amount of finely powdered blue vitriol. Turn the files in the mixture for a short time and then add half an ounce of vinegar and 10 ounces of sulphuric acid. Allow them to remain in this for about 10 minutes, after which dry with a cloth, rub with olive oil and then wrap in porous paper.

This process will thoroughly clean the tools and in most cases will even sharpen the teeth of worn ones. Fine files should not be allowed to remain in the bath as long as coarse ones.

WORN VALVE GUIDES AND STEMS.

(A. B. S., Hartford, N. Y.)

I have a 1913 Metz car in which there is a very bad knock and I think it is in the valve guides, which are worn some, as are also the valve stems. Would new guide bushings eliminate all knocking, or would new valves be necessary also?

Yes to both questions. Invariably when the valve guides are worn the valves will also evidence wear. You can easily determine whether new valves are necessary by calipering the stems to learn if they are badly worn. New valve guides and valves will considerably increase the power of the engine if the valves you now use are worn badly. The cost is insignificant compared with the increased efficiency of the engine.



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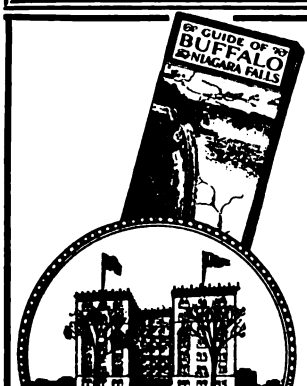
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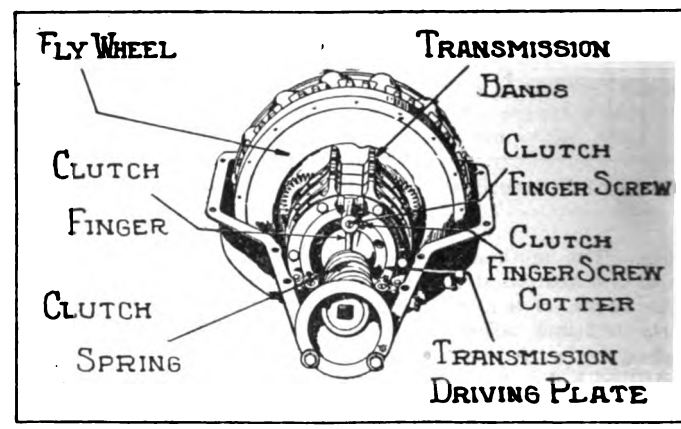
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MIXING ETHER WITH GASOLINE.

(J. W. L., Bridgeport, Conn.)

Is it advisable to mix ether with gasoline so that a richer mixture may be obtained and if so, what proportions are used? Will this mixture injure the motor? Is there any danger of an explosion when mixing the two? Can kerosene be mixed with gasoline in equal proportions to produce a satisfactory operating condition?

Would not advise the mixing of fuels, either ether with gasoline to make the latter more explosive, or kerosene with gasoline for the sake of economy. The former mixture is objectionable, being both unsatisfactory and dangerous, while the latter, when the ordinary carburetor is used, will form a fluid having a high vaporizing point and thus actually deteriorate the volatile liquid, gasoline.



View of the Working Mechanism of Ford Transmission with Front Floorboard and Transmission Cover Removed.

Ether is an oxygen carrier, this being the reason for it being suggested by many as an agent which will increase the value of gasoline as a fuel. With the modern heated carburetor, gasoline alone, even though it be of a low grade, should afford satisfactory engine operation. The high price of ether must also be considered. Since the combining of fuels is very seldom done, there is no rule on record for the mixing of the two.

To a certain extent, ether, oxygen, picric acid and other similar oxygen carriers injure the engine by subjecting bearings, crankshafts, cranks and other moving parts to unusual strains for which they were not designed. Picric acid is also said to form a deposit on the cylinder walls, which attacks the glaze and eats into the metal. It is not unlikely that if either ether or picric acid were used, they would cause trouble at the valves by attacking the seats.

There is no danger of spontaneous combustion when combining the fluids mentioned, but because of the higher explosive nature of the compound fuel, naked flames must not be tolerated near it.

PROPERTIES OF PHOSPHOR BRONZE.

(H. B. M., Cisco, Tex.)

In what respect does phosphor bronze differ from any other kind of bronze?

Bronze is an alloy of copper and tin with small proportions of other elements. In the year 1868 Monteflore & Kunzel, Liege, Belgium, discovered that by adding small proportions of phosphorous, or "phosphoret of tin or copper," to copper, that the oxides of that metal, which is nearly always present as an impurity in more or less quantity, were deoxidized and consequently the copper much improved in strength and ductility. Also the grain of the fracture became much finer, the color brighter and a greater fluidity was attained. The different kinds of bronzes are produced by combining such alloys as silicon, aluminum, etc.

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are unequalled for motor lubrication, freer from carbon, economical because they protect the motor against mechanical wear, and the quantity required is comparatively small.

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March 15th to 22nd Inclusive

Practically every make of car produced in America will be displayed at this event.

All parts, accessories, fittings, equipment (for cars and garages) car conveniences and supplies will be shown at the exhibits of the many jobbers and dealers.

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AUTOMOBILE JOURNAL

SHOW NUMBER

Mailed March 12th, last form closes March 10th.

The Automobile Journal blankets the New England field. It reaches all trade buyers. In this edition more than 20,000 car owners as well will read the announcements made in the advertising sections of this Journal.

One magazine, no duplication of circulation and one expenditure.

Wire reservation for space, send copy today or instruct your agency to do so.

AUTOMOBILE JOURNAL

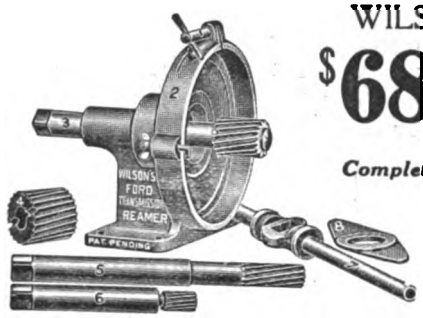
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AND DO THE WORK BETTER THAN THE BEST THAT EVER WENT OUT OF YOUR SHOP

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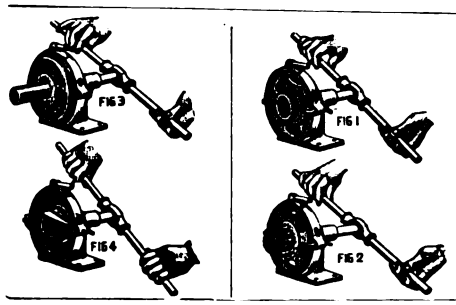
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Remanufactures a Transmission complete in 30 minutes

Does the work much better than any other known method. All gears revolve perfectly and without noise and excessive wear. This outfit eliminates all guesswork; ordinary men do better work than experts can do without it.

FIGURE YOUR PRESENT COST ON THIS OPERATION

then compare it with 30 minutes our way and see how much money (in labor) you are losing on every job. All Reamers of highest grade and guaranteed indefinitely. Thousands of these outfits in use by largest Ford agencies. If you want references, I can refer you to some Ford agent or repairman you know who has an outfit.



WILSON'S REAR AXLE PINION GEAR PRESS

takes off or puts on the tightest gear with ease. No hammering or damaging parts. Saves 75% of time usually required. Leverage 168 to 1. Nothing like it on the market and no substitute as good. Shipping weight 60 pounds.

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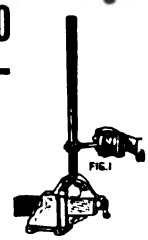
Wilson's Main Bearing & Connecting Rod Aligning Reamer

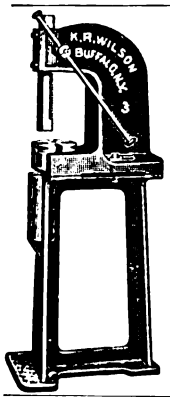


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Pilots guide the reamer. No chance to make mistake. Fig. 2 shows reamer cutting No. 1 and 3 bearings down to match the center bearing, which is always low and out of line. Then ream with all three in place, giving perfect alignment. No other reamer like it. Results impossible without the pilots and spiral flutes. Fig. 1, fitting connecting rods. First micrometer each of the throws. If less than 6-1000ths undersize, shaft is still serviceable. File off cap and tighten up bolts to fit pilot in usual way, as shown. Then release one nut about half turn for each 5-1000ths wear of the throw, and ream when fitted to shaft and both bolts tight it will be a perfect bearing fitting entire length and width. Far superior to any other known method. Motors put up this way can be started by hand.





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Guaranteed to give more power than you can handle. Price less than $60 complete. Circular, etc., ready Feb. 20th.

Deliveries start March 15th sure.

CAMSHAFT ALIGNING REAMER, $10.

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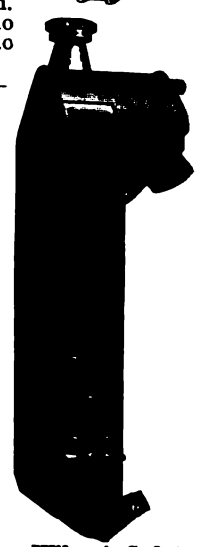
TRIPLE GEAR RIVETING JIG, $4.

Puts new life in triple gears. Ready for delivery now.

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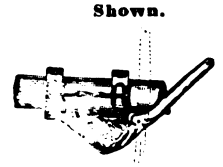
Honeycomb cores, reinforced tanks and side walls. Tanks guaranteed to support weight of 250 pound man without denting. Core has four times cooling surface of other radiators. Easy to repair if frozen. Side walls support radiator around its entire circumference instead of localizing support on end of bottom tanks. All weak points of other radiators have been eliminated. Sell at same price as Ford. Dealers' net cost, singly, $21 f. o. b. our factory. Lots of 5, $19.

See sample at Auto Shows.



Wilson's Safety Valve Cut-Out.

Improved Design Not Shown.



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FIRST WEEK ONLY.
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GET MY CATALOG IT SHOWS HOW TO MAKE MORE MONEY THAN YOU EVER THOT COULD BE MADE ON REPAIR WORK

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WE NOW MANUFACTURE

In Large Quantities

Pistons (regular and lightweight), Step-Cut Rings, Diagonal-Cut Rings, Wrist Pins, Wrist Pin Bushings, Rear Axle Shafts, Spindle Body Bolts, Spindle Arm Bolts, Stationary Cones and Adjustable Cones.

Guaranteed to satisfy most rigid requirements on material, sizes and workmanship.

THE BEST ALWAYS



Standard Weight

SIZES

STANDARD
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.005 oversize
.010 oversize
.015 oversize
.025 oversize
.031 oversize
.033 oversize



Lightweight

FORD TYPE PISTONS

Car Owners and Dealers Want Dyer Pistons Because:

1. All Measurements are Guaranteed Correct.
2. They are Accurately Fitted With the Best Step-Cut Rings.
3. They are of Uniform Weight—3¼ Pounds.
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5. The Pins and Bushings are Made From the Best Stock Carefully Ground, Reamed and Fitted.

NOTE: *We are again producing our well-known cast iron "Lightweight" piston which is One Pound lighter than the regular Ford giving less wear and vibration and more power and speed.*

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Buy your parts for all
Atwater Kent Ignition Systems
from authorized Atwater Kent dealers. Don't buy imitation parts, they may be the cause of serious accidents and much additional expense in the long run.

24 hour Repair Service.
Write for Price List.

Atwater Kent Sales Co. of N. E.
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AUTO PARTS.
50% to 90% Off List.
24 Hour Service. Unlimited Stock.
Pope-Hartford, Columbia, Reo, Overland and 200 other makes.

Motors,	$20.00 up	E. Presto Tanks,	$4.00
Magnetos,	$3.50 up	B. Presto Tanks,	$4.75
Cylinders,	$3.00 up	Bearings,	50c up
Springs,	$1.00 up	Rims,	$1.00 up

1000 Other PARTS Bargains.
If you want any part not listed here,
Write Us—We Have It.

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are saving money for our customers all over the country. They can do as much for you. Write for catalogue and price list immediately and see the offer we are making you.

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It Is the Famous VACUUM Mobiloil.

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EXPERT REPAIRING; every known Magneto and Ignition System, Starters, Motors, Generators. **Magneto Exchange and Repair Shop, 269 Halsey Street, Newark, N. J.**

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Skillfully Done Assured Satisfaction
Prompt Service

The repair work turned out of this shop is of the highest merit—because I know how. If you have electrical and magneto troubles, no matter whether it is a

Bosch
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or any other make, I can fix them. My well-appointed plant, coupled with skilled workmen, assures you of expert magneto service. SEND IN YOUR MAGNETO. 24-HOUR SHIPMENT.

REBUILT MAGNETOS
PLATINUM PARTS
GENERATOR BRUSHES
BEARINGS, ETC.

Correspondence Invited.

The Magneto Shop

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197 Massachusetts Ave., Boston, Mass.

FORD PARTS

50% TO 75% OFF LIST.

These Parts are in perfect condition and will give long service.

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Ford Wheels.....$1.25
Ford Tail Lamps.....$1.50

Parts for 1917 Cadillac, Stearns-Knight, Buick, rear ends for all cars. Kissel, 1914 Studebaker, Overland, model 79; Lenox, Stoddard-Dayton, Michigan, Oakland and Lozier; Gray & Davis generator and starter; Delco lighting system; high-tension Bosch and other magnetos; Stromberg and other carburetors, generators, starters, Kellogg pumps, headlights, electric and Presto, and windshields, tires, rims and tubes from 30x3 to 37x5.

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For

Magnetos, Coils, Starter and Generator Systems. Brushes, Platinum Rivets.

H. & L. MFG. CO.
300 West Broadway New York

We Are Exclusive
SELLING AGENTS
for the N. F. G.
CARLISLE CORD TIRE.
Dealers write for our special proposition.
CAMBRIA TIRE EXCHANGE.
204 Columbus Ave., Boston, Mass.

Write to Brockton

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AUTO PARTS

REAR ENDS, TRANSMISSIONS, GEARS, REAR AND FRONT AXLES, WINDSHIELDS, GENERATORS, ETC.

We can save you real money on any auto part for any make of car.

Write For Our Price List.

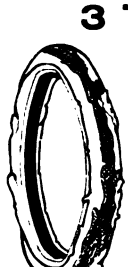
A. Berger & Son
104 OTIS ST. BROCKTON, MASS.



SMASH-UP. Tel. Beach 2013. Radiators repaired and rebuilt. Rush work a specialty. Special rates to Auto. Journal readers. **Expert Auto Radiator Co., 214 Pleasant St., Boston, Mass.**

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3 TIRES FOR THE PRICE OF ONE



TO CAR OWNERS—Why pay high prices for your tires when we can furnish you three tires for the price you pay for one, and get three times more mileage? We have a money-saving proposition for every tire user.

HERE IS OUR STORY.

We take your old tire and retread it with a tread which is made by all the leading tire concerns—such as Goodyear, Goodrich, Firestone, Miller and Lee, etc.

If you can get three times as much mileage out of three tires as you would pay for one, why is this not a saving proposition? Our tires are used by doctors, lawyers, ambulances and express trucks. If it pays them, why not you?



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30x3	$8.75	32x4	$13.15	36x4½	$19.00
30x3½	9.95	34x4	14.20	35x5	21.15
32x3½	11.00	34x4½	16.85	37x5	23.35
31x4	12.55	35x4½	17.95		

Non-Skids 10% Extra.

To Those Who Have Never Tried Retreaded Tires

We retread your tire and send it to you; if it proves satisfactory you pay the express company, if not send it back to us at our expense and we will give you the market value for it.

Dealers Write for Our Special Proposition

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304 COLUMBUS AVE., BOSTON. TEL. BACK BAY 1147.

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TRADE OUTLET

Send it to Detroit

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Bosch DU4 Variable spark	$30.00
Bosch DU-4 set spark	25.00
Bosch D4 and Dr4	25.00
Bosch D6 and Dr6	30.00
Splitdorf 4 cyl. Dixie, high tension	25.00
Splitdorf 4 cyl., Models A, T, X and D	10.00
National 4 cyl. low tension	8.00
Briggs 4 cyl. low tension	8.00
Remy 4 cyl., type R L	15.00
Simms SU4 high tension	22.00

GENERATORS.

Deaco 6 volt	$12.00
Auto Lite 6 volt	15.00

COILS.

Splitdorf T S type	$10.00
Splitdorf box type	6.00
Bosch type A	10.00
Remy box coils	6.00
Remy type LC and LE	8.00
Briggs box coils	6.00

DETROIT MAGNETO REPAIRS ARE BETTER.

WE REPAIR any make magneto, coil, lighting generator or starter and give 24 hours service. Member Detroit Automobile Trade Association.

Detroit Magneto Exchange
192 Grand River Ave. Detroit, Mich.

Seamless Steel Tubing

PROMPT SHIPMENTS GUARANTEED FROM STOCK OR MILL.

MURCOTT STEEL PRODUCTS CO.
253 Broadway, New York City

Our Guarantee

You take no risk in sending us your order, for we absolutely guarantee satisfaction. Unless you are fully satisfied with these tires, and with the saving, you are at liberty to return them at our expense. Not only will we refund your money, but also pay transportation charges as well.

SPRING STOCK OF TIRES

ANY STYLE—ANY SIZE—ANY MAKE.

We have just purchased an immense stock of tires—they are "seconds" in name only, as the quality is "First." We would like out-of-town buyers to inspect our stock. If this is not possible, our guarantee should convince you that we carry only the best in tires. All standard makes.

FIRESTONE—FISK—GOODRICH—HOOD—U. S.—ETC.

We Advise Early Buying

	Guaranteed Tires	Guaranteed Tubes		Guaranteed Tires	Guaranteed Tubes		Guaranteed Tires	Guaranteed Tubes
28x3	$9.50	$2.25	32x4	$18.65	$3.60	35x4½....	$27.50	$4.50
30x3	9.25	2.35	33x4	19.25	3.75	36x4½....	27.95	4.60
30x3½....	11.90	2.80	34x4	20.00	3.85	37x4½....	28.75	4.75
31x3½....	12.45	2.95	35x4	22.25	3.95	35x5	31.45	5.50
32x3½....	13.75	3.10	36x4	20.95	3.95	36x5	35.05	5.60
34x3½....	15.95	3.20	33x4½....	25.40	4.25	37x5	33.35	5.70
31x4	18.50	3.40	34x4½....	26.20	4.20	38x5½....	34.00	6.00

NON-SKIDS, 10% EXTRA.

DEALERS, ATTENTION! **Special Prices on Large Lots. Write for Our Special Proposition.**

Goods Ordered by Mail Sent C. O. D., Subject to Examination.
MAIL ORDERS Receive Careful and Prompt Attention.
Every Order We Send by Mail Is Carefully Inspected Before Leaving Our Store.

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Write AUTO PARTS CO. **For**

REPAIR PARTS

Our new bulletin of used parts and prices now ready.

With this bulletin in your shop you can supply repair parts for all makes and models of cars listed and increase your repair business.

It Is Free. Write for It Today.

AUTO PARTS CO.
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AFFA
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SPECIALTIES for the FORD



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They stop the rattle in:—

- The Brake Rod Supports
- The Brake Rod Clevises
- The Spark and Throttle Rods
- The Steering Spindles

They serve many other useful purposes and are inexpensive.

JOBBERS, DEALERS, write for prices and folder which mean money for you.

Price 50 cents per set
Affa Specialty Co., 34-D Southbridge St., Worcester, Mass.

Westchester Accessories Co.
Inc.

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PISTON RINGS.
All automobile sizes in stock.

Plain and Inland Parts.

BRAKE LINING.
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We can offer big price incentive to immediate replies.

AUTO SAVE 50-90% FOR 400 CARS PARTS

POPE, PACKARDS, PIERCE, BUICK, STEVENS-DURYEA, KNOX, OVERLAND, ETC.

Motors	$25.00 up	Presto Tanks	$ 4.50 up
Magnetos	4.00 "	New Spotlights	2.00 "
Carburetors	3.00 "	Generators	10.00 "
Rear Axles	15.00 "	Gears	1.00 "
Front Axles	5.00 "	Bearings	1.00 "
Cylinders	5.00 "	Radiators	10.00 "

$12 Diamond Bumpers.....$5.50

Jobbers in Bankrupt Auto Supplies.

BRIGHTMAN AUTO EXCHANGE
84 Wooster St., Hartford, Conn.

AUTO PARTS—At Your Own Prices. We can supply parts for nearly every make of car. 648 Packards, Interstate Fours, also Truck parts, GMC and other makes.

Write us for Parts. We have them.

STRANDWAY AUTO PARTS CO., 193-195 H. St., South Boston, Mass.

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BRINGS BIG RETURNS

20 Cents a Line, Seven Words to Line.

3000 MILES MORE

FROM THAT WORN OUT TIRE!!

The tread of any tire may be worn clear through, but if the inner fabric is good we will retread it and double the life of your tire.

A NEW NON-SKID TREAD.

Solidly Vulcanized by Factory Process. Costs about one-third the price of a new tire and we give a guarantee of 3000 miles service. An economical proposition at any time—especially worth while now, in view of the high cost and probable scarcity of tires.

CORP BROS. **40 Mathewson St., Providence, R. I.**
Phone Union 4179-R.

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Keep the Profits Coming in

by establishing a complete department in your business for Tire and Tube Repairing. Hold the tire business of your present customers and win new ones.

Tire and tube repairing goes on all the time and pays three to four times the average per cent. profit on motor cars.

But—do your tire repairing under the latest approved methods with one of the outfits designed by the leading tire engineers—an

Akron-Williams

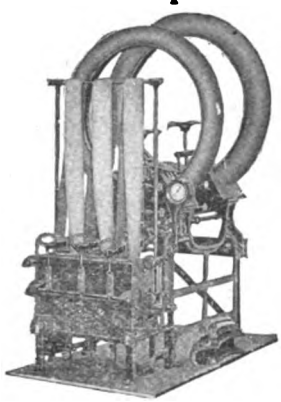
TIRE REPAIR OUTFIT

Akron-Williams Vulcanizers are so designed that by the use of reducing shells all the cavities can be used on smaller size tires, thus practically doubling the curing capacity of the outfit for most sizes.

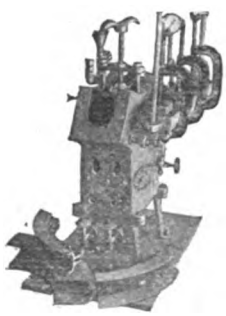
There's an Akron-Williams outfit for every shop and a machine or tool for every purpose.

Send for catalog and prices

Below are only two of our complete line



Model "M"
Will vulcanize two casings and three tubes at one time.



Model "D"
Takes on casing and three tubes at one time.



THE WILLIAMS FOUNDRY & MACHINE CO.

Ash Street, Akron, Ohio

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THE AUTOMOBILE JOURNAL

VOL. LXVI. PAWTUCKET, R. I., FEBRUARY, 1919. NO. 7.

NEW YORK DEALERS' SHOW BEST EVER ORGANIZED

Madison Square Garden and 69th Regiment Armory Filled with Exhibits That Attracted Record Attendance—Buying More General Than at Any Previous Exhibition—New Cars Few in Number, But Body Designs and Finish Were Features

BRILLIANTLY successful in every respect, the New York passenger automobile show made it evident that this is to be a truly wonderful year for everyone connected with the industry. The attendance, number of sales and prospects and, in fact, everything in conjunction with the exposition surpassed the most sanguine expectations of all.

It was the first show ever held under the auspices of the Automobile Dealers' Association of New York, Inc. The manufacturers representing the National Automobile Chamber of Commerce, which conducted previous shows, decided as a war measure to postpone their annual shows. However, they were glad to admit that the metropolitan dealers had the right idea.

The manufacturers extended their hearty cooperation, and nearly all of the western factories sent representatives to New York, giving the show a thoroughly national character.

Automobile engineers were so busy helping Uncle Sam to whip the Hun that they had no time to turn out new models mechanically. This fact did not feaze the New York dealers. Probably it was just the opportunity they had been seeking to demonstrate to the manufacturer something of the psychology connected with automobile salesmanship.

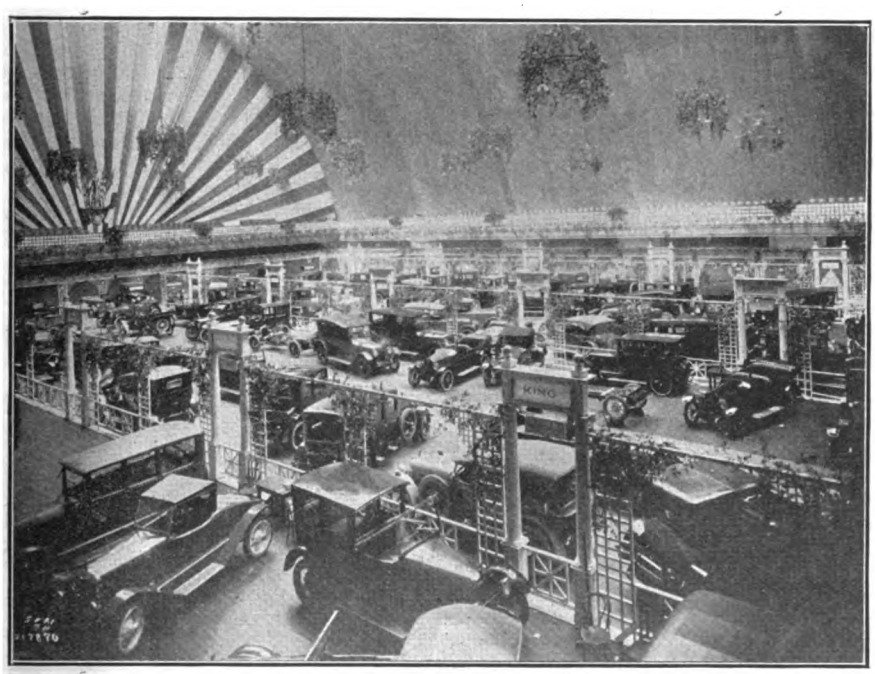
The dealer realizes that the average buyer is greatly interested in the body design as well as in the mechanical features. The buyer seeks a car with "personality"—something that will differ from most other cars. He wants a machine in which he and his family will be proud to ride.

Body Designs the Feature.

Undaunted by the lack of mechanical changes, the dealers fitted up their old chassis with special bodies, removing the conventional touring top and replacing it with the more distinctive Victoria top. They succeeded in not only making the cars look different, but with a superabundance of bright colors they made the cars look more beautiful than ever.

It was really more of a body show than anything else, but it was a well worth while exhibition. The visitors appeared to be extremely well pleased and everybody was happy.

Their hunger for snappy new cars, starved by the sacrifices made necessary by war, and having plenty of money, the prospective buyers came to the show to select what they considered would best suit their personal tastes in the automobile world. The dealers had so well foretold their desires that there were no disappointments.

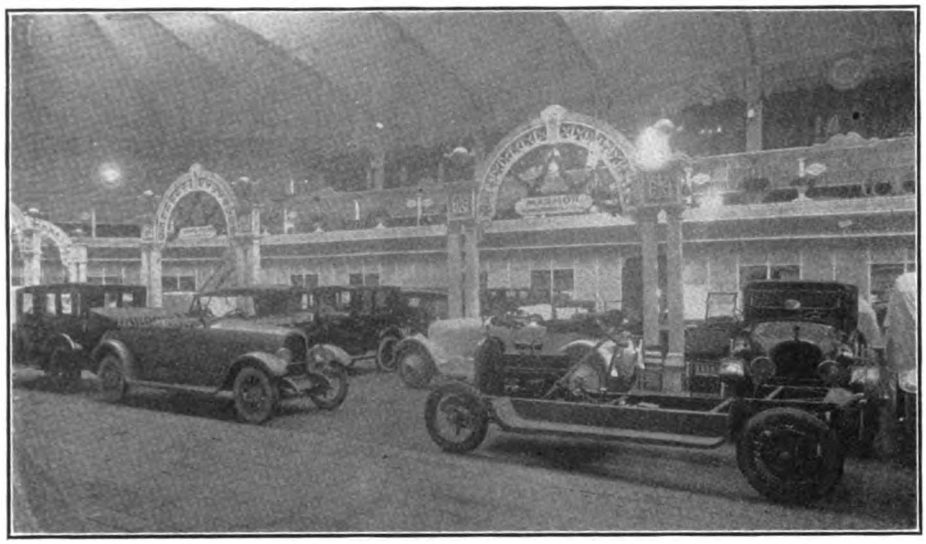


General View of 69th Regiment Armory, Showing the Decoration Scheme, with the Mammoth Sunburst of Colors. In the Foreground Is the Exhibit of King Passenger Cars.

Daintiness and luxury, utility and comfort combined in richly finished, cosy and speedy looking cars, awakened the buying impulse that had been lulled for 18 months of war and restrictions. Makers of the bodies had vied with one another in producing real works of art. There were many new little conveniences and graceful and dignified refinements of design that enhanced the appearance. There were improvements that add to the comfort and convenience in driving, giving full protection in any kind of weather, and graceful and sweeping lines. Many of the cars had an air of individuality, with tones of color used with effective artistry, with smartness and grace in poise and in varieties to conform to almost every personal taste. The bodies were a splendid tribute to the progressiveness of the New York custom body building industry.

A feature that stood out prominently in the show was the business like qual-

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Part of the Main Floor of Madison Square Garden, Which Shows the Parts of Displays of Marmon and Stearns-Knight Passenger Cars.

ity. Very few gaudy colors were to be seen and there were no sensational designs. In contrast to the standard dark colors were many pleasing body effects in light and dark blue and there were several delicate greens.

The show left no doubt that the day of the plain black touring car is disappearing, and that the standard type of body is no longer a strong sales point. Many exhibits did not include a single body of standard type. The sport type was a big factor. The aim was to present cars of distinction without freakishness. The bodies were so handsome that the cars might well be regarded as silent salesmen. They told their own story.

The desire to cut away from the staid color and cut and dried body line was fulfilled. Some dealers entirely changed the sombre tone of the upholstery by fitting seat covers of special design.

Engineers from the western factories were greatly impressed by the ideas of the metropolitan dealers, and it is very probable that hereafter the opinion of the New York dealers will dominate the factory body design.

It was the first time in a decade that Samuel A. Miles was not in charge of the show. Charles A. Stewart was the general manager and he came in for well deserved praise. He and the New York dealers, having arranged such a delightful show in a short space of time, are entitled to the heartiest of congratulations.

There were 23 fewer car exhibitors this year than last year and 111 fewer accessory exhibits.

Average Chassis Price Unchanged.

One of the interesting points brought out by a study of the cars on exhibition was that the average price of a 1919 touring car is about the same as when the European war broke out.

A prominent engineer who attended the show said, after a careful comparison of the leading makes of 1919, that the general average for what might be termed the composite car of the year ran toward a wheelbase of 120 inches, six-cylinder motor, L head and bloc cast, with a bore of approximately 3½ inches and a stroke of 4½ inches, tires 34 by 4 inches and the price $2128.

This average does not include the Ford car, and the price was reached by averaging the value of the chassis models and not the number of cars produced.

The average car of the year has a water cooled motor, horsepower rating of 33, centrifugal pump equipment, lubrication by the combination splash and pressure system, single ignition being used, the clutch of the disc type being part of the unit power plant, the gearset of the ordinary three-speed selective type and thed rive being through a propeller shaft to a spiral bevel pinion and ring gear to the floating rear axle.

Body Interiors Carefully Designed.

The high hood, straight line type, continues to be favored by the body builders, and, due to the employment of a shorter wheelbase, the interior of the body has been more carefully designed than formerly. The superelongated tonneau with the close front compartment is disappearing and a better balance is being struck between the driver's space and the passengers' compartment. The advantage is a shortening of the top by several inches, while giving better vision to the driver, and it reduces the head on wind resistance.

A study of the various models disclosed the fact that the detachable head type of engine occupies practically the same position as the leader in engine construction as in 1914. Sixty per cent. of the chassis models were of that type. Slightly more than 20 per cent. adopted the valve in the head design, about the same as last year, due, it is said, to the lack of engineering development during the war. The T head method of engine construction shows, however, a slight increase over last year, nearly 10 per cent. of the chassis models being of that type.

Some Body Characteristics.

Some of the features of style noted are:

Body sides as low as possible, while retaining comfortable seating, but hoods and cowls are kept up.

Great number of cars without ventilators either in the sides or on top of the cowl. Many bodies were so fitted, but in many instances the lower front part of the windshield was relied upon for ventilating the interior of the front part of the body.

Low effect aided by use of wire and disc wheels of 32 and 34-inch diameter.

Outside door handles used to considerable extent on open bodies, eliminating the use of pads on the door tops to facilitate closing.

A new design of small touring car body has an unbroken front seat, at the back of which is a robe rail.

Some bodies have step lights operated by the opening of the door.

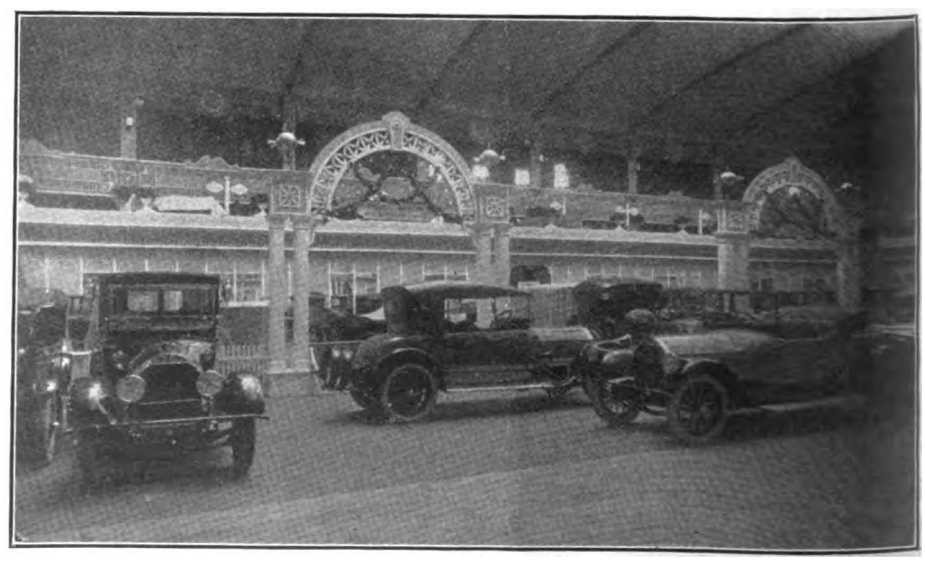
Upholstery trimming practically the same as last year.

Where one-man tops are fitted the gooseneck attachment is conspicuous, coming completely above the trimming line.

Striping is used to some extent on the higher priced cars.

Majority of cars have varnish surface, which shows off the shape and design to the best effect.

Wire wheels used largely on closed cars, as well as on open bodies.



Three of the Principal Exhibitors at Madison Square Garden. the Agencies for Pierce-Arrows, Willys-Knight and the Stutz Passenger Cars.

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Trimming on closed bodies is plain in pattern and color of material.

Paint uniformly brighter than usual.

Two New Cars Shown.

The new Essex, which was exhibited for the first time in the East, and the Noma, were the new cars of the show, and both attracted wide interest.

The Noma is an attractive sport roadster, with an altogether distinctive turtle deck at the back. It is an assembled car, to be produced and marketed by the Noma Motor Corporation, 155 Avenue D, New York City. It is equipped with a Continental model 7-W six-cylinder engine, a Detroit three-speed gearset, Standard axles and a Gemmer steering gear. The wheelbase is 128 inches and wheels are wire, fitted with 32 by 4½ inch tires. The price is $2500.

The Essex was exhibited by the Hudson Motor Co. of New York, which had an elaborate display. The entire concert hall, a large room off the main floor of the Garden, was taken by the company. There were comfortable chairs, stenographers and other real conveniences for the sub-dealers. Ten complete Essex and Hudson cars were displayed.

The new Essex is built at the Hudson plant in Detroit. The purpose of the new Essex is to meet the demand for a high grade car, light in weight, economical in upkeep and moderate in price. Its features include easy riding qualities, the power for hills and acceleration and smooth flexibility of operation and the beauty of the outline of the costly cars. It was entered in the class selling under $1500.

The George W. Copp Co., Inc., New York, displayed the anchor sedan top for Buick touring car. It is a fine piece of coach building with graceful and pleasing lines.

First Garden Show in Six Years.

It had been six years since an automobile show had been held in Madison Square Garden, all the exhibits since 1913 having been held in the Grand Central Palace, but that building was unavailable this year, as it has been turned into a debarkation hospital for wounded soldiers and sailors. The large number of exhibits forced the show committee to hire as an annex the Armory, which is within a block of the Garden, in Lexington avenue.

Both buildings were decorated in an elaborate and patriotic manner and no automobile show ever held in the Garden was ever made more attractive. The Garden area was covered with pale blue bunting, and from the girders were suspended a row of artistic chandeliers, interspersed with American flags and green foliage.

In the Armory an arbor effect of trellised vines and flowers had been artistically worked out, but the chief feature was an immense sunburst of red, white and blue, forming a vast semi-circle extending high up the ceiling from the rear wall.

Makes of Cars Shown Was 52.

In the two buildings were displayed 52 makes of cars, including all the best known models. Thirty-two of these were in the Garden, occupying all the arena floor and the concert and exhibition halls. In their many types of open and closed cars they aggregated more than 150 machines.

One feature in the Garden was the large number of chassis exhibited, conveniently arranged so that every detail of the motor and mechanism might be studied with the utmost ease. While the closed cars have been growing proportionately in popularity, especially the comfortable sedans, the exhibit of open models, both of small roadsters and large touring cars, was fully as large as that of the closed types.

In the Armory 26 different makes were shown, representing more than 100 types of open and closed bodies. In the Armory also was the only foreign made car in the show, a magnificent Rolls-Royce, one of the best English built cars.

Refitted Car Priced at $14,000.

No Rolls-Royce motors have come to America for two or three years. The one exhibit had been entirely overhauled and fitted with a coupe collapsible body. Its price was $14,000, being the most expensive car in the entire show. The car was shown by the Brooks-Ostruk Co. The same firm of body builders also showed what might be termed a camouflaged Pierce-Arrow car with a radiator of the well known Italian Fiat type. This was a $9000 car.

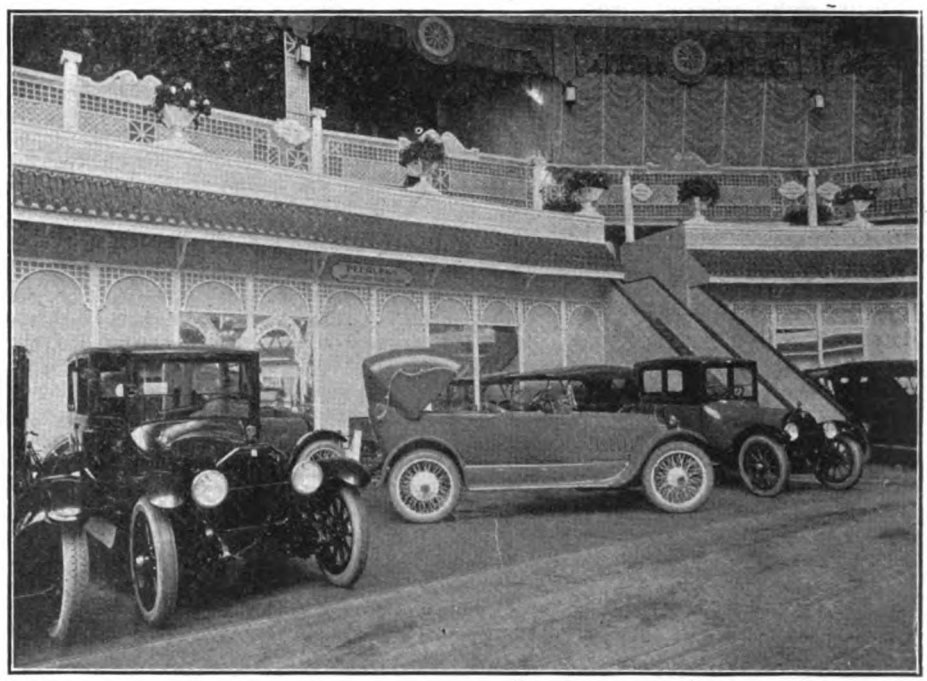
The chassis exhibit in the Armory was fully as interesting as in the Garden. In addition to the cars in the Garden, the galleries contained a multitude of accessories, these exhibitors displaying necessary and luxurious additions to add to the convenience and sometimes to the expense of motoring.

The show was opened with great enthusiasm on Saturday night. Never did a New York motor exhibit open with a larger attendance on the first night, and it was easy to see that the majority of the visitors were genuine seekers for the latest improvements in design and mechanism. Long before the opening of the doors, Madison avenue in front of the Garden was crowded for the entire width of the sidewalk, and at the 26th street corner the line extended half way down the block toward Fourth avenue. The women were as numerous as the men, and many soldiers and sailors were in the crowd. Scores of automobiles were parked around the square early in the evening.

Among the early visitors was Capt. Eddie Rickenbacker, America's premier "ace," who had just arrived from France.

Each Day a New Feature.

Army and Navy day attracted several hundred officers, soldiers and sailors Monday. In view of the special military and naval features it was natural that particular interest should be centered in the so-called Gen. Pershing car, a big, dull gray, serviceable looking machine, that was the chief feature in the Locomobile exhibit in the Garden. It is known as the Overseas model, and is an exact duplicate of the original service car shipped abroad for Gen. Pershing several months ago.



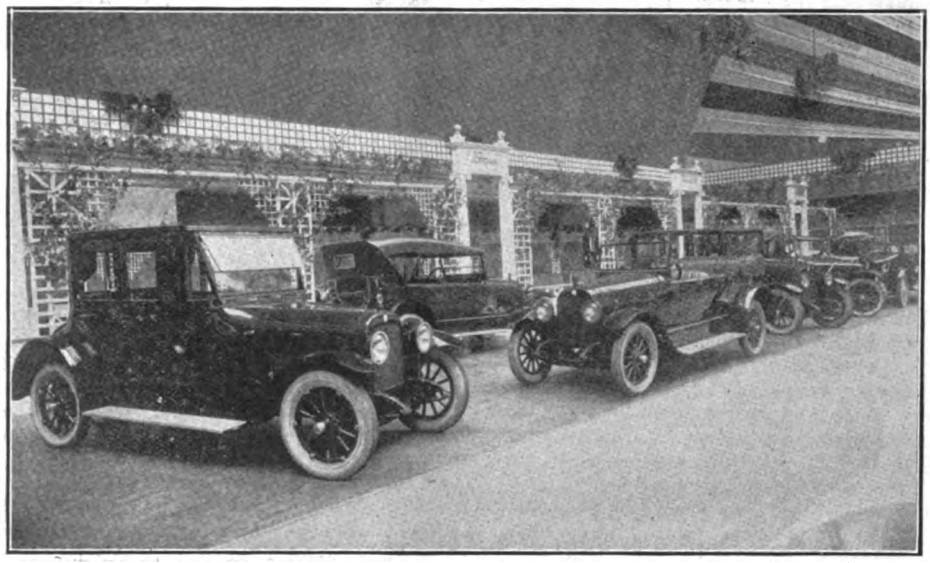
Section of Stand of the Van Cortland Vehicle Corporation, Agent for Peerless Passenger Cars, at Madison Square Garden, at Which Latest Productions Were Shown.

The main point of difference in this military car which distinguishes it from other touring and closed types are the double disc wheels on the rear, each fitted with heavy double tires. One reason for this is that owing to the hard usage of the military cars, if one of the dual tires is damaged the other one can carry the load without stopping to fit on a new one. An extra double wheel is carried in the rear and two single wheels in the front mud guards. The windshield is tilted back at an angle so as to allow for minimum wind pressure and high speed.

One wealthy motorist was so impressed with the car's novel features that he gave an order for one the first day, double rear wheels and everything.

The second day of the exhibition was especially for the dealers and several

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In the 69th Regiment Armory, a Glimpse of the Exhibits of Jordan, Saxon and Crow-Elkhart Passenger Cars on the Main Floor.

hundred members of the National Dealers' Association were present, as well as delegations from dealers' organizations of Brooklyn and nearby cities. Capt. Rickenbacker was present and some of his old racing comrades, including Barney Oldfield, Ralph Mulford and Dario Resta. Barney Oldfield arrived from the West with the announcement that he had retired from racing to assume the presidency of the Oldfield Tire Co. of Cleveland.

Society Day was observed Thursday, when the largest crowd of the week was entertained in both buildings. Engineers' Day was Friday and several hundred delegates who had been attending the annual meeting of the Society of Automotive Engineers were present.

Dealers Had Special Features.

Afternoons and evenings in the Armory talks on motor engines, illustrated by diagrams, were given by Lieut. J. G. Jamison, recently discharged from the United States Air Service. He has been engaged by the Elgin Motor Co., Chicago, and he explained the similarity of the overhead valve operation in the new Elgin Six car as compared with such aeroplane engines as the Liberty, Curtiss and Hispano-Suize. A complete Elgin chassis was shown, giving a clear idea of the motor feature.

The Marmon cars were shown in the Garden. Their characteristic features were the general use of aluminum, the Z section frame, the three-piece touring body, the compound cantilever cross-suspension type of rear springs and the transmission held in suspension on the front end of the torque tube.

The Maxwell cars, both open and closed models, use the same chassis. The body designs have been improved in many respects and the three-passenger coupe was a feature of the show for a low priced closed car. The sedan is a very roomy car for a moderate wheelbase. The small and large Chalmers touring cars, displayed with the Maxwell product, have been designed with the particular aim of giving the utmost comfort for long trips.

The Dodge Bros. sedan and coupe models, shown by the Colt-Stratton Co. of New York, proved attractive models of the medium priced class. Freak ideas have been avoided in the body designs. The coupe is roomy enough for three persons, and ample room has been provided in the rear to carry sufficient baggage for a week-end tour.

Plate Glass Top Windows.

A distinctive feature marked the Paige cars in the use of plate glass in the rear windows. The glass is on metal frames, and differs entirely from the small pyroxolyn windows used for several years. The Larchmont sport model has an oblong glass window, with slightly rounded corners setting off in a neat manner the straightline effect of the body.

The features of the Reo display were the four-passenger coupe and the five-passenger sedan. The latter was upholstered in French velour and morocco leather, with silver fittings and framed glass windows.

The Studebaker cars show many improvements this season. The new Studebaker light four, with its small wheelbase of 112 inches, has been designed to carry three persons comfortably in the tonneau, while throwing no excess weight upon the rear wheels. Particular attention has been given by the designing engineers to the proper distribution of weight so as to give the most perfect balance for ease in riding and economical operation.

The Cole "Aero-eight" cars were among the features of the Garden. They retain practically the same appearance as last year, but show many minor improvements, which enhance the attractiveness of both the open and closed models. The roadster accentuates the straight line effect of the aerotype body, and is finished in a naval gray, with gray fenders. On one side is a golf compartment, and a baggage receptacle on the other. The Cole tourster had a rich blue body with wheels to match. Among the closed models, showing attractive designs and the best appointments, were the coupe, sedan and town car.

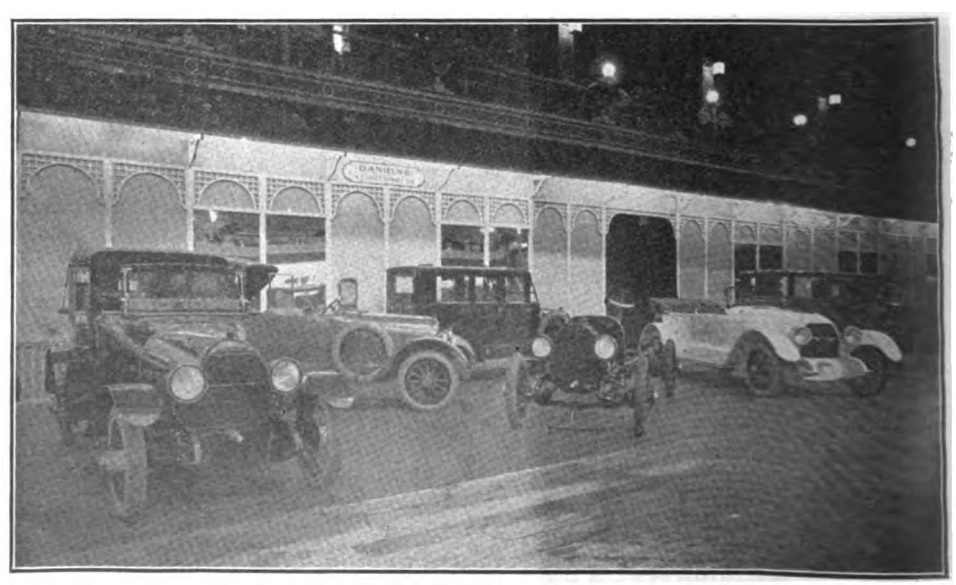
American Cars Are Attractive.

One of the newer cars which attracted considerable interest was the six-cylinder American, of which a chassis, the roadster and five-passenger touring car were shown. A new transmission is one of the year's improvements, and the slanting windshield is another new feature.

The King eight-cylinder models have been slightly modified in their lines and the finish of the top. A new type of ignition has been installed this season and the former propeller shaft brake has been removed, both brakes being on the rear wheels. The wheelbase length of 120 inches is still retained. The rear suspension is the cantilever spring used in the King cars for several years.

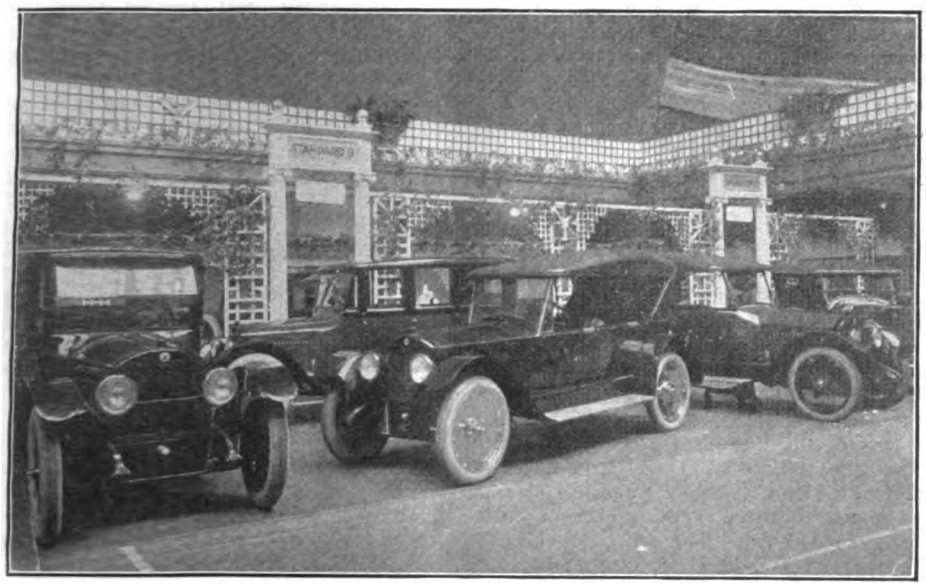
No show would be complete without a variety of bridal coupes, and there were several of this type that never failed to arouse the interest of the women visitors. The Maxwell showed a wonderful creation finished in white with nickel plated trimmings and the interior upholstered in dainty cretonne.

The Packard and Dodge Bros. cars made a fine appearance, the Packard



At Madison Square Garden, Looking Across the Exhibits of Daniels Eights and Stearns-Knight Cars, Two of the Noteworthy Displays.

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At the 69th Regiment Armory the Standard Eight and the Westcott Passenger Cars Attracted Much Attention.

Twin-Six town cars representing virtually the last word in luxurious appointments.

The sedan and coupe in the Pierce-Arrow exhibit were of the same luxurious finish and appointments, and a similar high standard in design and equipment was true of the large Locomobile exhibit.

Fabroil Gears in Liberty Six.

The engineers of the Liberty Six car have discarded the ordinary steel gear and replaced it with the Fabroil gear, made by submitting thousands of layers of silk impregnated with a secret chemical composition, to tremendous hydraulic pressure, and facing it on either side with fine steel plates. The gear operates with absolute quietness.

The Hudson Super Six provided surprises in new body creations of greater beauty than ever before.

Family groups at the show gathered around the handsome Chandler sedan and Chandler coupe. These two convertible cars were real features.

The 1919 Allen five-passenger touring car, attractive in the medium priced class, pleased with its sturdy, clean construction and graceful lines.

The displays of the Peerless, Mitchell, Buick, Daniels, Winton, Velie and the many other makes of passengers cars were all that could be desired. A bridal blue roadster, just roomy enough for two and sentimentally decorated with white ribbon bows in the Buick booth, attracted much attention.

Two of the genuinely palatial cars in the Garden were the Owen-Magnetics, one being a richly finished dark blue limousine-sedan and the other a seven-passenger light blue touring car.

Distinctive Finish of Lexington Cars.

One of the distinctive cars in the Armory was the Lexington five-passenger touring car, with its light blue body and cream colored finish for the lower portion, giving a very stylish effect. The maroon colored sedan and other closed models were richly designed with mahogany interior fittings. Recognizing the popularity of the closed car, the Lexingtons appear this year in five distinct types—a small coupe for three passengers, a larger one for four passengers, a four and a five-passenger sedan and a seven-passenger limousine-brougham, the latter so arranged that it may be converted into either style. Mechanical simplicity has been achieved by eliminating many parts, while at the same time improving the operating ease and expense. One of the valuable features is what is called the "one-finger emergency" brake, constructed with an eight-inch drum, mounted upon the front universal joint directly behind the transmission case, and controlled by a hand lever at the driver's right. It does away with the double-brake rods and linkage necessary under the old method which applied the braking power to both rear wheels, and eliminates the uneven pull often caused by an improperly adjusted rod.

A popular exhibit in the Garden was that of the Cadillac cars, of which several models of standard body types built for the eight-cylinder chassis were shown. For open cars the features were the seven-passenger touring car and the sporty four-passenger phaeton. Among the closed types the four-passenger Victoria coupe stood up conspicuously among the smaller cars at the show. It may be readily converted into a snappy open car. Among the closed types shown were the landaulet, limousine and town car.

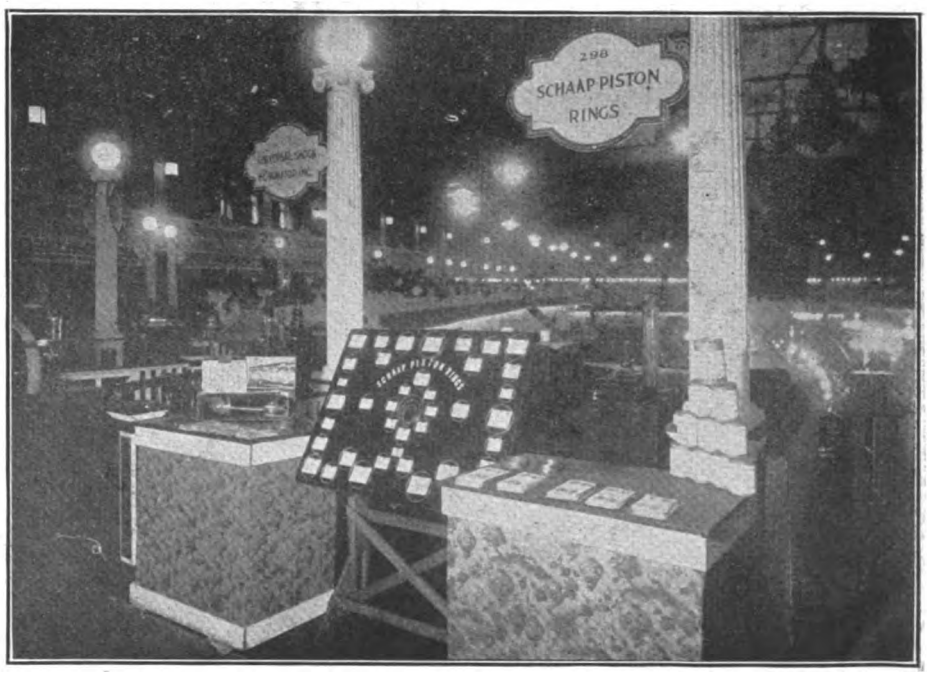
The Dort exhibit in the Garden included a stripped chassis, showing the simplicity of the four-cylinder engine; a five-passenger sedan finished in blue and green, and a roomy five-passenger open touring car.

The Auburn cars showed a new body design, the bevel edge body having been adopted this year. The feature of the new models was the four-passenger sport car, finished in dark blue.

All of the Jordan cars in the Armory had aluminum bodies. It is more costly than other materials. Edward S. Jordan, president of the company, said that the saving of weight in the use of aluminum means economy in fuel and tire consumption, while contributing to the neat appearance of the closed models.

Aluminum Bodies for Haynes Cars.

The Haynes cars, of which four attractive open and closed models were shown, were practically unaltered from the standard models, the body design revealing refinements in graceful, straight lines. Aluminum is being used for the bodies this year, the first time for almost four years. The newest type is the roomy seven-passenger touring car, fitted with wire wheels, an extra, but very neat equipment. The other three models were the "fourdore" roadster, sedan and coupe. The Haynes is one of the few makes providing both six and 12 cylinders for the same sized chassis. The six-cylinder motor is in more general use, but there is a



A Typical Stand in the Accessories Section at Madison Square Garden, with the Exhibit of Schaap Piston Rings in the Foreground.

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steadily increasing demand for the 12-cylinder type.

The Oakland open-frame chassis, with a mirror attachment beneath the running six-cylinder motor, was always surrounded by a curious group, the mirror having a special interest for the woman motorist. Among the fully equipped Oakland cars was a sport yellow roadster, a sedan with wire wheels and a coupe finished in rich maroon.

The Franklin cars, with the only air cooled engines on exhibition, attracted attention in the Armory because of the compactness of their design and finished body work. One of the striking exhibits was the four-passenger touring car finished in deep olive. There was also a five-passenger sedan and a five-passenger open car.

Knight and Overland Exhibits.

In the Garden the Willys-Knight and the Willys-Overland four-cylinder models in both closed and open cars created interest. A feature of the exhibit was the Japanese purple four-passenger Knight touring car, equipped with a Victoria top. It was fitted with wire wheels, which added to its appearance, and in the rear was an especially designed basket carrier for two extra wire wheels. The open chassis of the new Overland, the little four-passenger car, was one of the novelties in the show, as it disclosed the mechanism of the latest model which the Willys company was preparing to build before the United States entered the war.

One of the new speed cars in the Garden was the National 12-speedster. It was finished in gray with red wire wheels and it had a tapering sweep of the body, resembling a torpedo. The back was hinged, proving a generous carrying compartment.

One of the newer cars in the Armory was the Phianna, of which a chassis, showing every detail of mechanism, and a limousine fitted with a custom built body were shown. The design of the car throughout is aimed at simplicity and sensibility. Extra long cantilever springs are used to insure the utmost comfort in riding and the rear axle construction, equipped with dual torque arms and triple compensating service brakes, is claimed to be a prevention to skidding on wet pavements.

The show was a double-header, the first week being devoted to passenger cars, with the second week for the motor truck show. It was the first truck exhibit held in New York since 1913. More than 60 trucks were displayed in the Garden and Armory, about half a dozen makes of farm tractors and several trailers. Each make of truck showed several models, bringing the total number of vehicles in both buildings to more than 200, ranging all the way from the lightest half-ton delivery wagon to powerful seven-ton trucks for heavy hauling.

More than $4,000,000 was spent for automobiles during the New York passenger car show. This means that more than 2000 new cars, averaging in value about $1800, were sold to as many private buyers in the New York territory.

It was the biggest volume of business ever done directly at any New York automobile show.

Chicago Displays Brought Gratifying Results

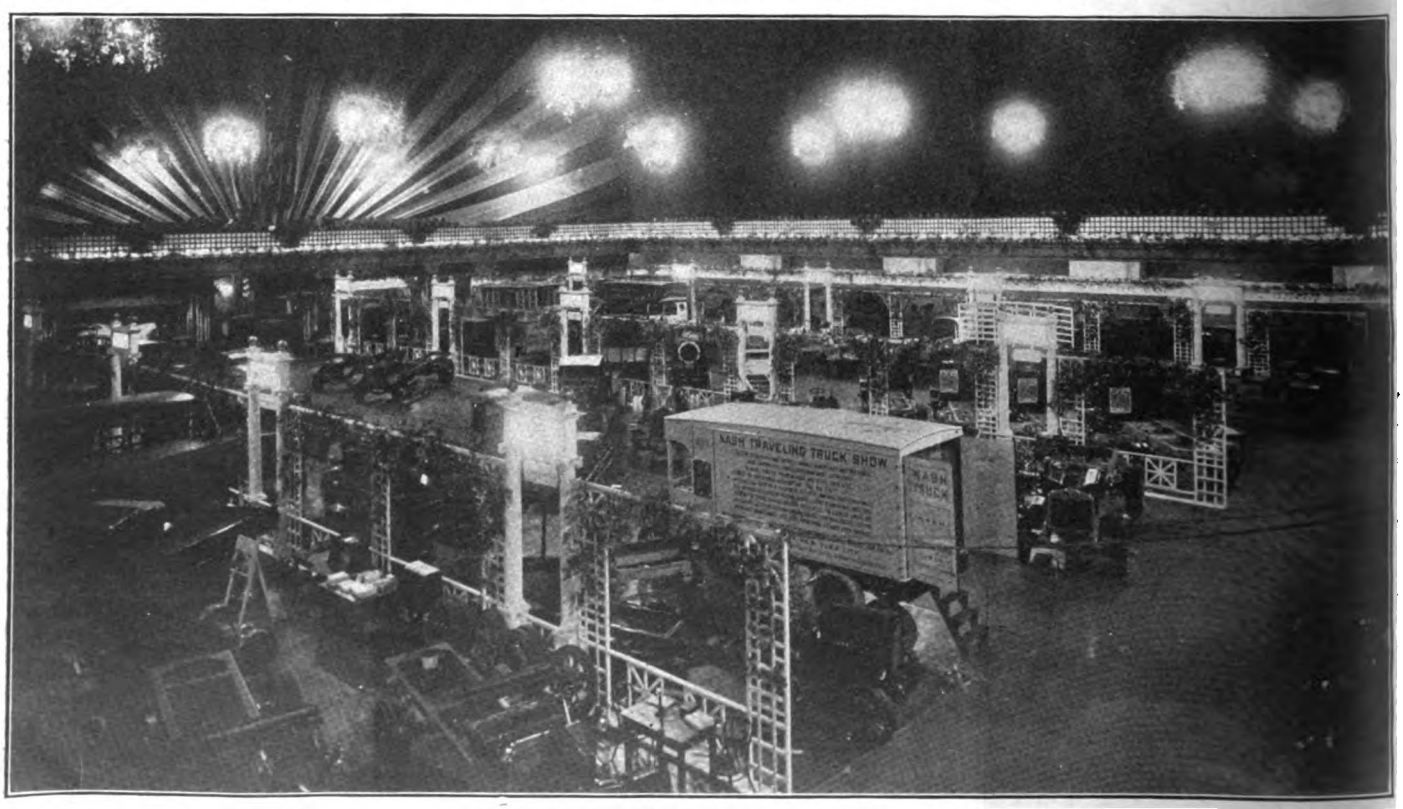
THE 19th annual Chicago passenger automobile show proved a wonderful success in attendance, number of sales made and interest created. It was held in the Coliseum, the Annex and Armory. Vast crowds were present every day. The show was held under the auspices of the Chicago Automobile Trade Association, composed of Chicago dealers. The manufacturers, who decided to forego shows as a war measure, cooperated to a considerable extent.

Greater individuality in body design was the big feature. There was a tremendous improvement in tops with graceful curves. Unusually large was the number of four-passenger cars, which had beautiful lines. It was the dealers' aim to exhibit cars that possessed individual charm, and which would inspire thrill and pride of ownership.

Mechanically there was practically nothing new, but this was to be expected because of the fact that the automobile manufacturers had been concentrating all their efforts to aid the United States in the war.

The new Essex was shown for the first time in Chicago and aroused much interest. The new little Overland touring car, which was shown last year in chassis form, appeared with a complete body. Ford cars equipped with electric starters made their initial appearance.

Cars that made their debut last season, but which were not manufactured because of the war restrictions, were on the floor with the minor imperfections



Looking Across the Main Floor of the 69th Regiment Armory from the Balcony During the Truck Exhibition That Followed the Passenger Car Show.

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that characterized them last year removed.

A big increase in bevel edge construction was noticeable. The double cowl type was still popular in many makes, but the rear cowl has been more subdued than in previous models.

Show Extremely Well Organized.

George H. Bird is president of the association which arranged for the show. Samuel A. Miles was general manager. The association had only a little time in which to make preparations, but the show organization was done remarkably well. The show was characterized by more cordiality between exhibitors and visitors than was apparent at some of the previous exhibitions. Most of the buyers sought immediate delivery, Chicago having the same mild weather as the East is enjoying.

On every hand it was agreed that the exhibition was the greatest automobile business show ever held in Chicago. Fred Vesper, president of the National Automobile Dealers' Association, was especially warm in his praise of the results obtained by the live wire Chicago dealers.

The show differed from former exhibitions in that every manufacturer knew just what was to be exhibited by his competitor. There were 68 exhibitors of cars this year and 79 last year. In accessories there were 135 exhibits this year and 146 last year.

There were 236 gasoline cars, nine electrics and no steam cars; 116 touring cars, 40 sedans and 20 coupes. The overlapping of the show in New York and the Chicago exhibition resulted in a decreased number of stripped chassis, cutaway engines and other mechanical exhibits, as manufacturers had been accustomed to shipping these from the New York to the Chicago show. There were only six engines exhibited, two of which were cutaway. There were 11 stripped chassis. Three chassis were in operation so as to show the function of the parts. Paige had a sawn-in chassis, which was also shown last year. Studebaker's gold chassis of last season was replaced by one in nickel finish.

Many Bodies Finished in Colors.

More colors were apparent than in former years, and there were many cars bright in hue. The number of cars painted in colors other than black was 27. Green was the next popular color, with 14 cars. There were numerous shades of green. Several cars had striking body designs.

A feature was the Daniels five-passenger sport design in light blue, with double cowl, having steps on the side instead of a running board. The car was completely outfitted as a sport example, even to a golf bag on the side to match the body.

A National white torpedo roadster with green running gear had fine body work, the low lines and artistic curve of the fan top giving it an aspect of speed and comfort.

A Kissel yellow roadster proved a good example of sport design. It had an exceptionally low top and low windshield, which gave it distinctive lines.

A Scripps-Booth roadster in maroon, in which the curve of the body was continued behind the seat, leaving an open storage space between the back of the seat and the curve of the body, created interest.

The four-passenger exhibits included a Paige car on a standard body in a shade of blue green with tan upholstery. The car had long narrow lines and the low well cut top gave it a pleasing appearance.

A Holmes air-cooled car, in a shade of blue, and with tan front hood in which the tan painting was carried back in a V shape toward the cowl, was an interesting model.

Universal employment of plate glass for the rear curtain lights was noticed.

Some Bodies Special Creations.

Some of the special bodies were created by the dealers themselves, while others were ordered. There was only one truck exhibit in the passenger show, this being a special showing of truck bodies by the Parry Manufacturing Co.

There was a big influx of dealers toward the end of the week.

The accessories were mainly in the balcony of the Coliseum, but there were



The Main Floor of the Coliseum, Seen from a Corner of the Balcony, During the Truck Show of the Chicago Automobile Trade Association.

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some in the balcony of the Armory. Few new accessories were shown, the accessory manufacturers, as well as the car makers, having been too busily engaged in war work to bring out new products. However, there was real interest in those that were shown, so that the exhibitors will doubtless find themselves repaid for their exhibits.

The lighting features and decorations in the Coliseum and Armory were as elaborate as at past shows. The main canvas formed the ceiling with scroll effects of purple and gold. At the ends the curtains extended from the curtain to the balcony, also in scroll effect. At both ends of the Coliseum there were transparencies, at one end representing the goddess of peace presenting the motor car to the world, and at the other a showing of various types of motor cars in outline. The Annex had a Japanese garden effect. Thirty-two pillars, each 23 feet high, were on the floor of the Coliseum and 16 in the Armory.

Wheeler & Schebler showed its new line of carburetors for the first time. Splendid weather prevailed during the show.

A. A. A. ENGAGES IN HIGHWAY HAULAGE WORK.

The American Automobile Association has added to its list of national boards one which will have to do with motor truck operation. President David Jameson has appointed as chairman of the new board Stedman Bent, president of the Automobile Club of Philadelphia, who is thoroughly acquainted with motor truck transportation needs.

The decision to have such a board was made by the executive directors of the American Automobile Association and was brought about by appreciation of the fact that the passenger automobile and the motor truck are economical fellow occupants of the road.

John R. Eustis, who has made a special study of road transportation, is the secretary of the Motor Truck Board, which will have its offices at the New York City A. A. A. headquarters, 501 Fifth avenue, at 42nd street.

The personnel of the Motor Truck Board will include men from all sections of the country. Every A. A. A. club which creates a motor truck committee will be given representation.

With a view of assuring that all interests will have a choice in the conduct of the board, George M. Graham of Buffalo, chairman of the Motor Truck Committee of the National Automobile Chamber of Commerce, has been asked by Chairman Bent to serve on this new board. C. A. Musselman of Philadelphia, George H. Pride of New York, E. C. Dunbar of Detroit, Henry Paulman of Chicago, W. B. Cheek of Omaha, Joseph Decker of Salt Lake City and H. R. Basford of San Francisco are among those who will be called upon to act on the board.

The Bell-Wyman Co., Yakima, Wash., has established a service department for International and Garford trucks and Titan tractors.

White Truck Groups Cited in French Army Orders

How American trucks made good in France is shown in copies of citations for distinguished service by French motor transport units using American made motor trucks. An award of the Croix de Guerre accompanied the citations for the first and second groupements, each operating 500 or more White trucks in the service of Great Headquarters Reserve No. 1. Later this entire reserve, operating 2500 Whites, was recognized by a similar citation.

"For the finest military spirit" and "the best qualities of endurance," read the orders of the day in the tribute for moving 200,000 troops to the front in a few days, many of them a distance of more than 100 miles, at a most critical time.

One groupement operated 200 hours out of 240. Another was on constant duty for 60 hours. It was not uncommon for drivers to remain at their wheels 24 hours at a time. This is the first and only instance in French military history of a truck formation receiving this high honor.

In forwarding copies of the citations the commanding officer made the following comment: "It is natural that the Little White was ahead to merit a reward of this importance." The citations follow:

ARMIES OF THE NORTH AND NORTH-EAST, GENERAL HEADQUARTERS.

Command of the Rear Automobile Service. Order No. 323 (Groupement No. 1).

Picked unit having participated in all important transports of the automobile service, in the course of which it has distinguished itself by its fine performance.

During the present operations, under the energetic and able command of Capt. Guionin, the entire French and Indo-Chinese personnel showed proof of the finest military spirit and the greatest endurance, providing without interruption the transportation of troops up to the line of battle.



One of the White Truck Groupements of the French Army, with Sengelese Drivers, Included Among Those Cited for Efficiency in Service.

THE AUTOMOTIVE INDUSTRIES IN CANADA.

The Dominion Bureau of Statistics, Ottawa, has compiled a preliminary report of a census of the automobile and allied industries. In 1917 there were 11 establishments classed as manufacturers of automobiles, accessories 24 and in repair work 497. The total capital invested in these industries was $35,780,677, apportioned as follows: In automobiles, $28,192,858; in accessories, $3,155,893, and in repair shops, $4,431,926.

NEW WILLARD BRANCH AT BOSTON.

The Willard Storage Battery Co., Cleveland, has opened a branch at Boston to cover the New England territory. The company has leased the portion of the large Garford building in Commonwealth avenue. J. J. Kennealy, one of the factory officials, will take charge of the branch. The Willard batteries were formerly sold by the W. H. and Webster Jones Co.

HARTFORD FOUNDRY CO. ENGAGES IN THE INDUSTRY.

The Hartford Foundry Co. is the name of a new firm that is establishing a gray iron and semi-steel foundry in Hartford, Wis. The company will specialize in automotive parts. Robert La Poine and Samuel B. Powers are back of the company.

WILL OPPOSE UNFAVORABLE TRUCK LEGISLATION.

The Detroit Automobile Club, through its Motor Truck Division, plans to wage a campaign against legislation unfavorable to operators of trucks on the state highways and to foster any fair legislation that may be proposed. More good roads will be encouraged.

H. W. Clark has become associated with the Chicago Pneumatic Tool Co. as manager of advertising. He was formerly in the advertising service department of the McGraw-Hill Publishing Co. in Chicago.

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MIDLAND MODEL M-S AND M-T TRUCKS

CONCENTRATION on what is practically a single design of power truck is the policy of the Midland Motor Car and Truck Co., Oklahoma City, Okla., a concern that has developed its truck division and is now prepared to produce these machines in considerable numbers. Oklahoma City is well into the southwest and seemingly remote from the cities where the automotive industry has been principally established. The claim is made by the Midland company that the location is extremely favorable from a business viewpoint from the fact that the materials can be transported to its plant at lower rates than completed trucks can be shipped from distant places by other manufacturers, and there is a considerable economy obtained that can be necessarily reflected in the market values of the machines.

Statement is made by the company that precisely the same construction units and parts can be obtained by it as are obtained by other concerns, it has equally good facilities for production, and the engineering standards are the same; that this being so the quality of the machines produced depends entirely upon the design, the factory facilities and the character of workmanship and supervision.

In organizing the truck department President and General Manager J. M. Aydelotte engaged Bert B. Fornaciari, formerly of the Harvey Motor Truck Co., Chicago, as production manager and chief engineer; W. B. Burgess as factory superintendent, William Ensign as superintendent of production, O. H. Brauer as engineer and F. J. O'Donnell as purchasing agent. The department was thoroughly equipped and every facility obtained that would insure manufacturing efficiency and economy.

Build Two Chassis to One Design.

The policy of the company with reference to manufacturing was determined, this requiring such essentials as were believed necessary for success. The purpose was to have practically one design and to build to this two chassis that would have 4000 and 5000 pounds load ratings, the main difference between these being in the type of rear axle. Decision was reached to use a worm and worm wheel drive for both, but a Timken full-floating rear axle for the lighter machine and a Sheldon semi-floating rear axle for the heavier.

Chief Engineer Fornaciari was for several years chief engineer for the Harvey Motor Truck Co., and he developed a design which is claimed to have exceptional qualities. After a considerable period of experimentation and tests of constructions the design was approved and plans for production made and a sales organization developed. The expectation of the company is to operate in that section of the country in which it is established—the Middle West, Northwest and Southwest, increasing its activities and its market as conditions justify. There is reason to believe that power trucks will be used in constantly increasing numbers in the agricultural sections of the country, especially where the distances to shipping points are considerable and transportation generally is costly. This being so, there is ample reason to believe that a concern located where it can afford a character of factory service such as is desired by owners will be successful in competition with other concerns operating at much greater distances.

Constructed from Standard Parts.

The design of Midland trucks is in every way conventional. The machines are constructed from units and parts that are produced by specialists. Without exception these are developments of years of manufacturing and service experience, based on thoroughly proven engineering and with the use of materials that have been in many cases approved by the best authorities of the industry. The company does not purpose to exploit exclusiveness of design or construction, but maintains that it has combined these units to obtain what will have exceptional quality. This has been done by careful study of and attention to assembly detail, the object being to have the design in every way measure up to the standard.

The chassis has been simplified to an unusual degree, all factors of safety are exceptionally large, and much care has been taken to have all moving contacting parts of such area that wear will be very slow. The simplification makes for economy of labor in maintenance and adjustment and restoration, and repair may be made with minimum labor. The provision made for lubrication is very well thought out, the object being to enclose all wearing parts wherever possible and to have protection against abrasive action that could be expected with any accumulation of free lubricant.

Units Are Carefully Chosen.

In the choice of the construction units only those that are known as specialized types were selected. These include Buda engines, Eisemann magnetos, Stromberg carburetors, Duplex governors, Borg & Beck clutches, Brown-Lipe transmission gearsets, Brown-Lipe controls, Sheldon rear axles, Timken rear axles, Sheldon front axles, Timken front axles, Sheldon springs and Ross steering gears. While the chassis are the same in design the two-ton unit is known as model M-T, this having Timken front and rear axles, and the 2½-ton unit is known as model M-S, this having Sheldon front and rear axles.

The chassis both have wheelbase of 150 inches, with 58-inch tread, overall lengths of 226 inches and widths 72 inches. The loading space back of the driver's seat is 132 inches. The chassis have road clearance of 11 inches. The frames are 31 inches above the ground when loaded and the floors of the bodies are 41 inches above the ground when fully freighted. The maximum speed recommended is 16 miles an hour.



Midland Model M-S Truck, with Platform Body and Removable Sides and Top Used for Long Distance Haulage of Oil Field Supplies from Oklahoma City, Okla., to Wellington, Tex., a Distance of 196 Miles, a Two-Day Trip.

Engine a Model HU Buda.

The Buda engines are a four-cylinder, four-cycle, water cooled, vertical, L head type, having cylinder bore of 4¼ inches and stroke of 5½ inches, these having rating by the S. A. E. formula of 29.10 horsepower. This is the model "HU," which was specified by the United States government in model A army trucks. The maker claims that this engine will develop 42.50 horsepower at 1850 revolutions. As this is largely in excess of what would ever be required with trucks of this capacity, the engine is governed so that this power output will not be reached.

The Buda "HU" cylinders are cast en bloc from a fine quality of gray iron with the water jacket integral, the top of the jacket being open. The intake passage from the left to the right side of the block and to the valve pockets is cored into the block, this insuring gassification

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of the fuel drawn from the carburetor before it reaches the cylinders. The head of the water jacket is a large plate with a deep, longitudinal channel in the center that increases in depth from rear to front, so that the water flows from the rear over the combustion chambers of the cylinders, effectively cooling them. The pistons are cast from the same quality metal, are fitted with three rings each and are grooved to insure equality of oil distribution on the cylinder walls.

General Details of Engine Construction.

The crank case is cast from gray iron in two sections. The upper section has a vertical transverse web that carries the center main bearing, and the rear support arms are cast integral. The lower section is the crank chamber and the oil reservoir. Forward extensions of the sections form the housing for the timing gearset. There is a series of longitudinal fins on the outside bottom of the lower section that serve to increase the rigidity of the casting and to radiate the heat from the oil.

The crankshaft is a special steel drop forging, heat treated and ground to dimensions, having three journals, these being 2⅛, 2¼ and 2⅜ inches diameter from front to rear, and lengths of 3⅛, 2¾ and four inches in the same order. The total bearing length is 9⅞ inches. The crank pins are 2⅛ inches diameter and 2½ inches length. The flywheel flange is forged integral with the shaft. The camshaft is a special steel drop forging with the cams and the flange for the timing gear integral. This is a three-journal type. The shaft is case hardened and it is ground to dimensions. The wristpins are steel tube, case hardened and ground, that are seated in the piston bosses, and on these the phosphor bronze bushed connecting rods oscillate. The main bearings and connecting rod are babbitt in bronze cages; the camshaft bearings are phosphor bronze.

The connecting rods are steel drop forgings that are heat treated. The timing gearset gears are large diameter and wide faced, and are cut helical. Much care is taken to have accurate gear centers. The relations of the gears are maintained by thrust screws, which prevent end play. By removing the cover of the bushing the gears are accessible. The valves are tungsten steel and operate in long guides. The valve tappets are a mushroom type that are fitted with adjusting screws and nuts and operate in large guides. The valve mechanism is enclosed by a cover plate retained by easily removable cap screws.

Cooling and Lubricating Systems.

The engine is cooled by a circulation of water through the cylinder jackets and a vertical finned tube radiator with cast top and bottom tanks, the top tank being finned. The radiator is cushioned on fabric pads and coil springs to protect it from shocks and chassis distortion. The water is circulated by a centrifugal pump driven by an outside shaft from the timing gear, the water entering the base of the cylinder jacket directly under the valves. Radiation is promoted by a large fan carried on ball bearings on an adjustable bracket on the forward end of the engine block, that is driven by a flat belt from a pulley on the forward extension of the water pump shaft.

The engine is lubricated by a geared pump driven from the camshaft that draws oil from the screened intake in the oil reservoir and forces it through a tube to the main bearings and the timing gearset. From the main bearings the oil is forced through channels drilled in the crankshaft to the crankpins and through tube to the wristpins. Oil forced through ducts cast in the crank case lubricates the camshaft bearings. The oil distributed by the centrifugal movement of the shaft lubricates the cylinders and pistons, cams and valve tappets. The oil drains to the base of the crank chamber and thence to the reservoir. The oiling system has 2¼ gallons capacity and the pressure is 40 pounds to the square inch at 1000 revolutions, when 1¼ gallons a minute is circulated. The pressure at 500 revolutions is from 25 to 30 pounds.

The source of the ignition current is an Eisemann high-tension magneto and the fuel is supplied through a Stromberg carburetor from a 25-gallon tank carried under the driver's seat. The governor is a Duplex.

The Power Transmission System.

The power transmission system includes a Borg & Beck single plate dry disc and a main shaft in two sections extending to the rear axle with a gearset mounted amidships. The clutch is completely housed and while it is instantly adjustable it requires no lubrication and comparatively little attention. The clutch is positive in action and very easy engaging. The forward section of the driving shaft has a universal joint at either end. The transmission gearset is a sliding gear selective type, having four forward speed ratios and reverse, the fourth speed direct drive and it is suspended at three points from two frame cross members. The gearset is heavily constructed and the gear faces are one inch width. The rear section of the shaft is equipped with two universal joints.

The Timken worm and worm wheel rear axle is a full-floating type and is fitted throughout with Timken roller bearings. The Sheldon semi-floating worm and worm wheel rear axle is fitted with annular radial and thrust bearings. The full-floating type has the wheels each mounted on two bearings on the outside of the axle housing, the wheels being driven by clutch plates on the shafts that engage with the wheel hubs. The semi-floating type has the wheels keyed to the outer ends of the driving shafts, which are carried on bearings mounted within the outer ends of the axle housing. In the former the axle housing carries the load and in the latter the axle shaft carries the load. In both types the worm shaft and the worm wheel and differential gearset and the bearings are mounted on the cover of the central section of the axle and run in oil baths. The driving and braking stresses and torque are taken by the springs, there being no radius rods.

The Other Chassis Elements.

The frame is pressed steel channel section six inches wide with 2¼ inch webs of ¼-inch metal, with the cross members strongly gusseted and reinforced, and the forward end is extended beyond the radiator, the front cross member serving as a bumper. The frame is suspended on semi-elliptic springs, the front set being 43 inches long and 2½ inches wide, and the rear set 56 inches long and three inches wide. The wheels are wood, artillery type, with 14 two-inch spokes forward and 14 2½-inch spokes rear. The wheels are shod with solid band tires, 36 by four inches forward and 36 by seven inches rear. The steering gear is a irreversible type, with heavy linkage, the steering column, with an 18-inch hand wheel, being located at the left side.

The control is by the usual foot pedals for the clutch and service brake, hand levers for the ignition system and fuel supply on the wheels of the steering column, with the gear shifting and the emergency brake levers in the center of the foot board. The brake shoes are an internal expanding type, operating within 18-inch drums on the rear wheels, these having unusual efficiency.

The chassis are equipped with driver's cabs with windshields and winter fittings, dashes, footboards, front mud guards, oil dash and tail lamps, mechanical horns, jacks, odometers and full sets of tools. The prices are $3000 for the two-ton chassis and $3150 for the 2½-ton chassis at the factory.

The accompany illustration is one of a number of trucks used for freight haulage over the Ozark trail between Oklahoma City and Wellington, Tex., a distance of 196 miles, the round trip requiring four days. The body is a platform type with solid removable sides and top. The freights are usually bulky material used in the oil fields of southwestern Oklahoma and northern Texas, or supplies for operators of oil wells and prospectors.

ASK CONGRESS TO SEND AUTO EXPERTS ABROAD.

A delegation from the National Automobile Chamber of Commerce will ask Congress to appropriate money to pay expenses of experts to go abroad and gather information which will aid in increasing the automobile export business.

In 1915 the exports of automobiles from the United States had a value of $111,554,000. This grew to $120,600,000 the following year. However, in 1917 the effects of the war were felt greatly and exports had a value of only $119,800,000, these products going to 82 different countries. With the war still on, the first seven months of the present year found a total automobile exportation of $56,943,000.

Great opportunities for the American motor car in Europe, the Orient, South America, South Africa and Australia, are seen by the automobile industries affiliated with the National Automobile Chamber of Commerce. The Bureau of Foreign and Domestic Commerce with the aid of the consular service is now the agency of this country for stimulating foreign trade.

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Production of Trucks Nearly 300,000 For 1919

The National Automobile Chamber of Commerce announces the results in the capacity analysis of truck production for civilian use, years 1918 and 1919. The report, which covers all makes of trucks, is as follows:

	1918		1919 (estimated)	
1 ton & under	100,417	47.9%	153,515	54.3%
1½-2½ tons...	79,070	37.6%	88,613	31.4%
3-4 tons.....	25,128	11.9%	21,676	7.7%
5 tons.....	5,079	2.4%	15,907	5.7%
Over 5 tons...	406	0.2%	2,683	0.9%
Totals.....	210,100	100.0%	282,394	100.0%

In connection with the foregoing figures our Mr. C. L. Halladay, chief engineer at the Washington office of the National Automobile Chamber of Commerce, comments as follows:

"It is very evident that vehicle speed is the determining factor which is forcing the decrease in the three and four-ton sizes.

"The five-ton size is equally as fast as the three and four-ton size under practical operating conditions, costs little if any more to operate and load conditions demanding a three or four-ton size can very readily and economically be handled, giving better service with less maintenance cost in the larger size.

"This means that the five-ton size is going to have practically a speed equivalent of the lighter sizes. Truck speed now is not a matter of engineering, but one of legislation for the municipality and road construction for the State Highway Boards.

"I venture to predict that within a period of five years we will have intercity truck freight service, which will maintain an average speed of 20 miles per hour and that the type of truck will be a tractor with semi-trailer—the tractors serving or operating within their own zone of 100 to 150 miles and the trailers running through to destination.

"Standardization of mounting semi-trailers on tractors should be sought and have a very definite place in the minds of progressive truck engineers of today, the dominating feature of which must be adequate length or wheelbase of the tractor so that ample space is provided for centralizing, over the rear axle of the tractor, at least 50 per cent. of the trailer load. Too much load on the trailer axle makes for difficult handling and a consequent loss in road speed. For this reason, legs or jacks are of little value as a means of support when changing trailers to other tractors; means for handling the front end of the trailer must be provided at terminals from overhead.

"The semi-trailer will not be used, except in special cases, other than on the long runs, trucks of the conventional type will act as pickups and deliver the freight to the terminal houses where the trailers will be loaded and dispatched. This will save time and reduce the total investment to an economic point."

N. A. D. A. CONVENTION AT CHICAGO.

The annual meeting of the National Automobile Dealers' Association will take place Jan. 28-29 at the La Salle Hotel, Chicago. Every automobile dealer is welcome. It is pointed out that a membership in a national association is a real business asset.

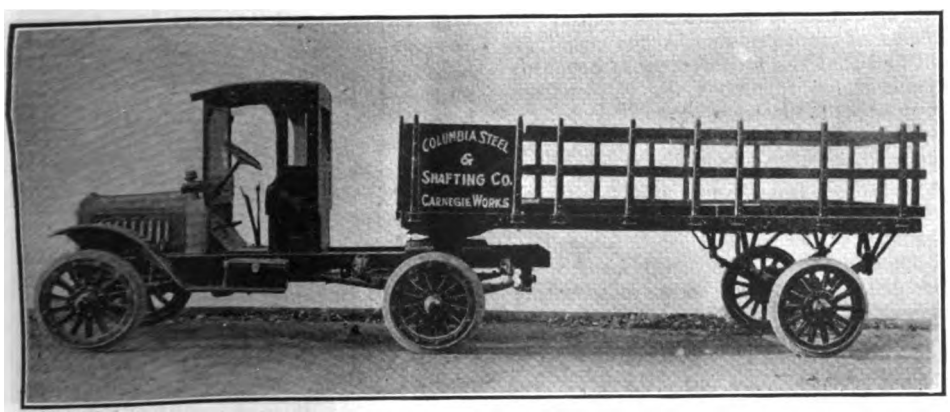
The annual meeting of the Motor and Accessory Manufacturers' Association takes place at the Congress Hotel, Chicago, Jan. 29.

FIRESTONE SALES INCREASED 23.7 PER CENT.

The Firestone Tire and Rubber Co., Akron, O., increased its sales 23.7 per cent. the past year, as compared with the sales the previous year. In 1918 the sales totaled $75,801,219, and in 1917 $61,587,506. Profits for the past year, after providing a liberal reserve for depreciation, taxes, etc., amounted to $8,320,442.

PHILIP GROSS DEAD AT 83.

Philip Gross, founder and president of the Philip Gross Hardware and Supply Co., Milwaukee, died Dec. 21, aged 83 years. The Gross company is one of the oldest and largest motor car accessory and general hardware houses in the northwest.



A Republic Truck Chassis Equipped for Tractor Service Used with a Fruehauf Semi-Trailer, Which Increases the Load Capacity About Three Times That of the Chassis Used Singly.

Soldier Drivers for Trucks Trained in Service

Returning soldiers will boost freight haulage work throughout the country to limits none have ever anticipated, in the opinion of Forrest J. Alvin, general manager of the United States Motor Truck Co. He recently secured figures in Washington showing that 172,691 men were at that time actively employed on the battle front of Europe in the units of the American army's motor transport corps. Many thousands of these, together with thousands who have been employed in America at the same time will elect to remain in the motor truck work Mr. Alvin thinks.

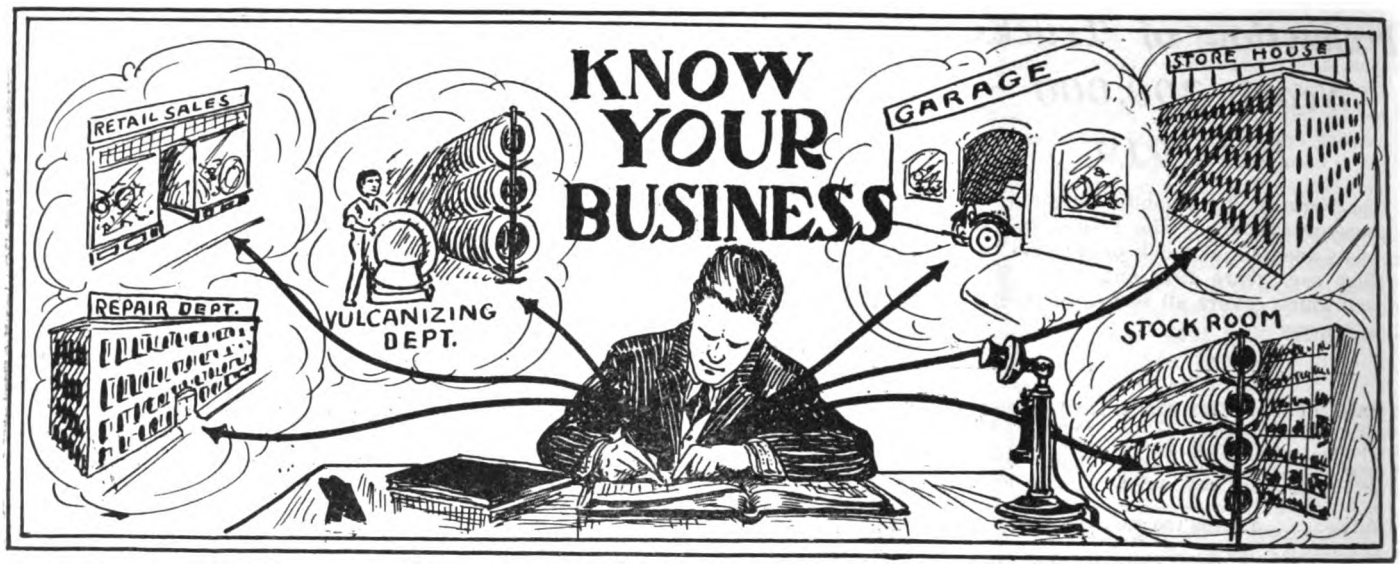
"The men who are 'over there,'" said Mr. Alvin, "and the men who have been employed in truck work for the army in America have learned to value the out-of-door life, and will seek forms of employment in America which will keep them on the same line of endeavor. This is going to give to America a vast army of men who will be fitted to carry on freight hauling throughout the country. Their training has been in fields requiring much more skill than is required on American roads.

War torn roads have beset these men and they have learned by experience to overcome difficulties which would never be met with on this side. I feel that our trained army men are going to return to America and boost freight haulage work throughout the country to limits none have ever anticipated. There will be room for all of them and that they will meet with ready positions upon coming back there can be no doubt. The United States Motor Truck Co. has had reasons to know that more heavy duty trucks of its manufacture would have been put into use had men been available. War work, which has prevented supplying the demands, will soon be gone, and then we shall be able to provide the trucks while the returning soldiers will provide the man power with which to start them in their great work of relieving the railroads of America, and of hastening freight shipments and express with door-to-door delivery, a feature which is going to grow and grow more and more into favor."

TAX ON AUTO SALES NETS U. S. $23,981,368.

The annual report of the Commissioner of Internal Revenue reveals how hard the tax on automobiles hit the manufacturers. The total amount collected for the fiscal year ending June 30, 1918, was $23,981,368.33. The tax was collected on a basis of three per cent. The first Michigan internal revenue district, of which Detroit is the center, paid more than 60 per cent. of all paid in the United States. In the new revenue bill, now pending in Congress, the rate is fixed at five per cent.

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UNCLE SAM'S ACCOUNTING SYSTEM FOR DEALERS

Federal Trade Commission Devises Method of Keeping Financial Records So As to Insure the Greatest Success Possible for Business Men

GREATER efficiency than ever is demanded by present conditions. The dealer who clings to old, hap-hazard methods is bound to be so far outstripped by his competitors that it will not be long before he will have to quit business. If he cannot adjust himself to modern practises he might just as well toss up the sponge now, as the future holds little promise for him.

An up-to-date system of accounts is now a necessity in all modern business. The man who continues to try to get along without an adequate plan for determining his costs is taking a short-cut to the bankruptcy court. Books must be kept, and they must be kept accurately. The better and more comprehensive the methods followed to this end, the greater the chance the dealer has for success.

The dealer who is lax in keeping a thoroughly modern accounting system is simply throwing a handicap to his competitor, for he is unable to price his goods intelligently and conduct his business upon sound principles. Even if a stroke of good luck should come his way his opportunity to take advantage of it would be narrowed through the fact that he would not have a correct statement of his financial condition to show to the banker of whom he might seek credit necessary for possible expansion.

Bankers Know Value of Accounting.

Bankers are paying strict attention to the accounting system used by business men who seek credit. They are willing to give larger loans and very often more liberal terms, to the man who keeps his books in such a manner that enables him to show the bank at any time just how his business is progressing. The man who can show progress is bound to receive more consideration with the same amount of assets than the one who cannot.

Whether the prospective borrower is making proper provisions for depreciation on stock, buildings and fixtures is something of great importance to the banker, and books should be arranged so that this information is immediately available.

The strenuous competition of these days compels a dealer to make close prices, and this is not possible with profit unless an accurate financial statement of costs is kept. Failure to keep such accounts properly may result in a dealer doing business at a loss, in the belief that he is making a profit.

Comprehensive Uniform System.

The Federal Trade Commission, desiring to save dealers from making the mistake of neglecting to keep their accounts properly, has, after a study of various systems, devised a system of accounts that is unusually simple and should appeal to the dealer. The aim has been to devise the least involved system which will give the information essential to successful management. A business man will find that the best system of accounts is one which furnishes the information required with the least effort.

The greatest value to be derived from an adequate system of accounts is that of making comparisons and analyzing differences. In order to maintain the simplicity of the system herein presented, no departmentalization of the accounts is provided for, but any concern operating distinct departments can readily adjust the system to show the results obtained in each department.

Must Know Overhead Costs.

In order to determine his costs a dealer must know his overhead expenses. With a proper arrangement of his accounts the percentage of overhead may be readily obtained. Business not done at prices high enough to cover this percentage is actually done at a loss.

The most convenient way of arriving at the proper percentage to add to the first cost of goods for overhead is to use the average ratio of operating expenses to net sales covering a past period. For instance, if a dealer's annual receipts for the last fiscal year were $25,000, and the expense of conducting his business was $5000, his overhead was 20 per cent. By adding the desired percentage of profit on sale to this overhead percentage, and deducting from 100 gives the percentage of invoice cost to selling price. The invoice cost of an article divided by this percentage gives the selling price.

Rapidity of Turnover Essential.

Rapidity of the turnover is a very important element in conducting a retail business. It is obvious that an increase in turnover goes hand in hand with an increase in profit. A slow turnover may be due to poorly selected stock, to overstocking, to an inefficient selling organization. No effort should be spared to increase the turnover to its maximum. To ascertain the turnover divide the cost of goods sold during the year by the cost of the average stock carried.

Only four books of account are required to operate the system of accounts here outlined. They are a journal, a general cash book, an invoice book and a ledger. Sale tickets and credit tickets are used for recording sales and sales returns. From these books certain statements, particularly a monthly summary of business, a profit and loss statement and a balance sheet, should be prepared at definite periods in order to present the results in comprehensive form.

Journal.

The ordinary two-column journal can be used. The opening entry is an inventory of the assets and liabilities. The totals of the charge sales as shown by the charge tickets should be entered in

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MONTHLY SUMMARY OF BUSINESS, 19 (Form A.)

	Net Sales			Buying Expense.		Selling Expense.			Delivery Expense.		General Expense								
	Credit	Cash.	Total.	Salaries and Wages of Buying Force.	Miscellaneous Buying Expense.	Salaries and Wages of Sales Force.	Advertising.	Miscellaneous Selling Expense.	Salaries and Wages of Delivery Force.	Miscellaneous Delivery Expense.	Management and Office Salaries.	Office Supplies and Expense.	Insurance on Stock and Store Equipment.	Taxes on Stock and Store Equipment.	Losses from Bad Debts.	Miscellaneous General Expense.	Rent.	Total Expense.	Per Cent of Net Sales
Jan	$3,356.31	$1,301.65	$4,657.96	$25.00	$14.00	$177.33	$30.00	$3.75	$102.67	$8.08	$269.00	$22.03	$1.61	$2.50	$33.56	$26.79	$71.25	$787.57	16.9
Feb																			
Mar																			
Apr																			
May																			
June																			
July.																			
Aug.																			
Sept.																			
Oct.																			
Nov.																			
Dec.																			
Total,																			
Per Cent. of Net Sales																			

the journal, debiting accounts receivable and crediting sales. The totals of the credit tickets are also entered in the journal, debiting sales with returns and sales allowance with price concessions and crediting accounts receivable.

Transactions which do not go through either the cash book or invoice book should also be journalized. These entries comprise such items as notes receivable and payable, allowances or corrections of purchase invoices after entry in the invoice book, the various adjusting entries at the end of the month, and the closing entries at the end of the fiscal period.

Journal entries affecting trade customers' and trade creditors' accounts will also have to be posted, respectively, to accounts receivable account and accounts payable account.

General Cash Book.

This book is for recording all cash transactions. The left hand, or debit, side is for recording receipts, and columns should be headed as follows, in the order named: Date, name of account, description, ledger folio or LF, collections on accounts receivable, cash sales and general accounts. The right hand, or credit, side is for recording payments, and these columns should be headed: Date, name of account, description, check No., ledger folio or LF, discount on purchases, payments on accounts payable and general accounts.

The total cash receipts of each day should be deposited daily in bank and all payments should be made by check. The total of cash sales for the month should be checked against the total cash sales tickets, and is then posted to the credit of "Sales," that of the "Collections on "Accounts Receivable" to the credit of "Accounts Receivable Account," and that of "Payments on Accounts Payable" to the debit of "Accounts Payable Account." The total of the discount on purchases column is also posted to the debit of accounts payable.

All payments for expense items other than petty cash should be entered on the cash book as made and posted therefrom to the proper accounts. At the end of the month all expense bills for the month should be paid, so as to insure the expense being charged in the proper month.

Petty cash disbursements, such as car tickets, telegrams and such minor items for which it is not expedient to draw checks, should be handled as follows:

A check should be drawn for an amount sufficient to cover petty disbursements for a definite period. At the end of the period the cashier should prepare his petty cash statement, which should be supported by vouchers, and a check drawn for the exact amount of the statement, thereby restoring the petty cash fund to the original amount. This check should be entered in the cash book in the regular way, charging the various expense accounts as shown by the petty cash statement.

The balance of the general cash book at all times should check with the balance as shown by the check book plus the amount advanced for petty cash.

In the check book keep checks and deposits footed separately. When the bank book is balanced, check up the bank list, then rearrange the checks in numerical order, and check with the stubs. If any checks are outstanding, note them on the stub and deduct from total of checks drawn; the check book balance will then agree with the bank book balance.

Invoice Book.

This book contains the record of the invoices or purchases of merchandise only and should carry the following headings: Date of entry, date of invoice, number of invoice, from whom purchased, address, ledger folio or LF and amount of invoice.

The postings are made direct from this book into the purchase ledger and the total at the end of the month carried to the debit of merchandise purchases and to the credit of accounts payable.

Where the business is departmentalized a more elaborate form of invoice book should be used, giving departmental subdivisions of purchases.

Sales and Credit Tickets.

The use of sales and credit tickets for recording sales and sales returns has become almost universal.

A sales ticket must be made out for every sale and the daily total of these gives the sales for the day. The cash sales tickets are checked against the cash received and the charge tickets go to the bookkeeper. Credit tickets must be made out for credits to customers and these likewise go to the bookkeeper.

Ledger.

The accounts in the ledger should be arranged in the following order:

1. General accounts.
2. Accounts with trade creditors.
3. Accounts with trade debtors.

Allotting to each class such space in the ledger as may be necessary.

The general accounts should be arranged in logical order. (See arrangement of accounts.)

Accounts with trade creditors and with trade debtors should be arranged alphabetically, using preferably a loose leaf ledger.

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Where the volume of business permits, it is advisable to use three ledgers, a general ledger, a purchase ledger and a sales ledger, keeping controlling accounts of the purchase ledger and the sales ledger in the general ledger.

Where only one ledger is used it should be divided into three sections corresponding with the above.

The balances of the purchase ledger and of the sales ledger, or of these sections of the ledger if only one book is used, must agree with the balances of the accounts payable account and of the accounts receivable account. The advantage of these controlling accounts is that the aggregate of accounts payable and of accounts receivable can be had at any time without listing the balances of the individual accounts.

Customers are charged with goods purchased direct from the charge tickets. These tickets are first listed, then turned over to the bookkeeper, who posts them to the debit of the proper accounts, listing the amounts as he posts, then comparing his total with that of the first list, which must agree. Credit entries for allowances, reductions, cash discounts, or returned goods, are made from credit tickets in exactly the same manner.

Posting to the ledger therefore must come from one of four sources—the cash book, the journal, the invoice book or the sales and credit tickets.

Monthly Summary of Business.

This record, Form A, will be found very useful for monthly and yearly comparisons of expenses and ratios. It is arranged with columns for sales, both cash and credit and total, and for the various expenses of the business. The figures on this statement are taken from the ledger.

Each month the figures for that month should be added to the previous total so that the record will give the totals from the first of the year to date as well as the monthly totals.

Profit and Loss Statement.

The amounts for making up this statement, Form B, can be had from the ledger and from the trial balance. It is made up at such times as the inventory is taken. A physical inventory should be taken at least once a year. The basis should be cost with conservative deduction for obsolete and shelf worn goods. The inventory at the beginning of the period is, of course, that brought down from the end of the last period.

When monthly profit and loss statements are desired, and where the percentage of overhead and profit is known, the approximate cost of the goods sold can be arrived at in the following manner: Deduct the percentage of overhead and profit from 100 and multiply by the amount of the net sales; the result will be the cost of the goods sold, which when deducted from net sales will give the approximate gross profit on sales.

If desired, the difference between the values placed on the inventory and the actual cost of same can be shown on the statement. Show the actual cost of inventory and then the deduction under the title "Stock Depreciation," carrying the net forward as illustrated. While this is not necessary, it is valuable information and this method is recommended.

The total net profit as shown by the statement is that carried to the credit of the proprietor's account in the ledger.

Balance Sheet.

Ledger accounts should be kept by the double entry principle with all real (asset and liability) accounts, as well as with all nominal (profit and loss) accounts. A balance sheet of the same date as the profit and loss statement should be made up from the balances of all real accounts. The ordinary asset and liability accounts and a logical classification thereof are shown by Form C.

ACCOUNTS AND THEIR EXPLANATIONS.

REAL ACCOUNTS.

1. Cash on Hand and in Bank.

Charge this account with the total receipts of the month and credit it with the total disbursements as shown by the cash book. The balance should agree with the cash book balance.

2. Notes Receivable—Trade Customers.

Charge this account with all notes, time drafts and acceptances held against others and credit it with the same when paid or otherwise disposed of. The balance will show the uncollected notes receivable.

3. Accounts Receivable—Trade Customers.

Charge this account with the total of the charge tickets of the month, and credit it with the cash payments by customers (taken from the cash book at end of month) and with notes receivable, discounts, returns and allowances (from the journal and credit slips). Balance of this account must agree with the sum of the balances of trade customers' accounts.

4. Reserve for Bad Debts.

Credit this account with an estimated amount, based on charge sales, sufficient to provide for losses, and charge the account with the balances of personal accounts when hope of collection is abandoned.

5. Prepaid Insurance.

Charge this account with all insurance, fire, burglary, fidelity, plate glass, liability, etc. At the end of each month charge the proper accounts (Nos. 35 and 44) with

PROFIT AND LOSS STATEMENT. (Form B.)

							Per Ct	Per Ct.
23	Sales				$4,659 96			
24	Less Sales Allowances				2 00			
	Net sales				4,657 96			100
	Inventory of merchandise at beginning		$3,451 09					
25	Merchandise Purchases (cost delivered at store)		2,759 67					
			6,210 76					
	Deduct inventory of merchandise at closing	$3,062 17						
	Less Stock Depreciation	153 11	2,909 06					
	Net cost of goods sold				3,301 70			70.9
	Gross profit from trading				1,356 26			29.1
	BUYING EXPENSE.							
26	Salaries and Wages of Buying Force	25 00						
27	Miscellaneous Buying Expense	14 00						
	Total buying expense		39 00				0.8	
	SELLING EXPENSE.							
28	Salaries and Wages of Sales Force	177 33						
29	Advertising	30 00						
30	Miscellaneous Selling Expense	3 75						
	Total selling expense		211 08				4.5	
	DELIVERY EXPENSE.							
31	Salaries and Wages of Delivery Force	102 67						
32	Miscellaneous Delivery Expense	8 08						
	Total delivery expense		110 75				2.4	
	GENERAL EXPENSE.							
33	Management and Office Salaries	269 00						
34	Office Supplies and Expense	22 03						
35	Insurance on Stock and Store Equipment	1 61						
36	Taxes on Stock and Store Equipment	2 50						
37	Losses from Bad Debts	33 56						
38	Miscellaneous General Expense	26 79						
39	Rent	71 25						
	Total general expense		426 74		787 57		9.2	16.9
	Net profit from trading				568 69			12.2
	INCOME FROM OTHER SOURCES							
42	Interest	17 09						
43	Cash Discounts on Merchandise Purchases	6 55						
44	Rent income (net)	16 52						
45	Miscellaneous Outside Income	2 00			7 98			
	Total net profit				576 67			

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their proportion, the balance being an asset as "Prepaid Insurance."

6. Accrued Interest Receivable.

Charge this account at the end of the period with all accrued interest (not yet paid) on notes, etc., due from others, crediting "Interest Account." When the interest is received it is credited to "Accrued Interest Receivable."

7. Store Property.

Charge this account with the purchase price of the store property. Do not charge repairs to this account, unless they are in the nature of permanent improvements. A fair amount should be periodically credited to "Reserve for Depreciation."

8. Warehouse Property.

Charge this account with the purchase price of the warehouse property. Do not charge repairs to this account, unless they are in the nature of permanent improvements. A fair amount should be periodically credited to "Reserve for Depreciation."

9. Reserve for Depreciation on Store and Warehouse.

Credit this account with the amount of depreciation on store and warehouse, and charge same to "Rent Income" (No. 44).

10. Store Equipment.

Charge this account with the value of all equipment such as counters, shelving, scales, measures, etc., used in the conduct of the business. A fair amount should be written off periodically for depreciation.

11. Office Equipment.

Charge this account with office furniture, desks, safe and other office appliances (not included in 34). A fair amount should be written off periodically for depreciation.

12. Delivery Equipment.

Charge this account with the cost of automobiles, wagons, horses and harness. This account must not be charged with repairs to automobiles and wagons, horseshoeing or anything of this nature. A fair amount should be written off periodically for depreciation.

13. Notes Payable—Trade Creditors.

Credit this account with all notes given to trade creditors or time drafts accepted in their favor and charge the account as the same are paid. Balance of this account shows the amount of notes payable outstanding.

BALANCE SHEET, ... (Form C.)

	ASSETS.						
	CURRENT ASSETS.						
1	Cash on hand and in bank	...	..	$1,611	67		
2	Notes Receivable—Trade Customers	.....	..	191	84		
3	Accounts Receivable—Trade Customers	$3,518	81				
4	Less Reserve for Bad Debts	33	56				
				3,485	25		
	Inventory of merchandise (at cost)	...	..	2,909	06		
5	Prepaid Insurance	.. ..	..	100	14		
6	Accrued Interest Receivable	.....	..		71		
	Total current assets	. ..	..	. .	.	$8.298	67
	FIXED ASSETS.						
7	Store Property	4,500	00				
8	Warehouse Property	1,975	00				
		6,475	00				
9	Less Reserve for Depreciation on Store and Warehouse	26	98				
				6,448	02		
10	Store Equipment	.....	..	272	71		
11	Office Equipment	.. ..	..	74	37		
12	Delivery Equipment	.....	..	396	67		
	Total fixed assets	.....	.	.....	..	7,191	77
	Total assets	.....	..	... .		15,490	44
	LIABILITIES AND CAPITAL.						
	CURRENT LIABILITIES.						
13	Notes Payable—Trade Creditors	1,210	50				
14	Notes Payable—Banks	900	00				
15	Accounts Payable—Trade Creditors	3,685	72				
16	Accounts Payable—Others	485	00				
17	Accrued Interest Payable	19	23				
18	Accrued Salaries and Wages	82	00				
19	Accrued Taxes	7	75				
	Total current liabilities	.....	..	6,390	20		
21	Mortgages Payable (warehouse)	.....	..	1,250	00		
	Total liabilities	.....	..	7,640	20		
22	Proprietor's Capital Account	....	..	7,850	24		
	Total liabilities and capital	.....	..	.....		15,490	44

14. Notes Payable—Banks.

Credit this account with all notes given to banks and charge the account as the same are paid.

15. Accounts Payable—Trade Creditors.

Credit this account with merchandise bought on account, the amount being carried to this account monthly from the total of the invoice book and charge it with all merchandise returned and reductions (journal), and payments made and discounts taken (cash book). Balance of this account must agree with the sum of the balances of trade creditors' accounts.

16. Accounts Payable—Others.

Credit this account with amounts owing to creditors other than trade creditors.

17. Accrued Interest Payable.

Credit this account at the end of the period with interest accrued (not yet paid) on notes, etc., due others, charging "Interest Account." When the interest is paid it is charged to "Accrued Interest Payable."

18. Accrued Salaries and Wages.

Credit this account with salaries and wages earned and unpaid at the end of each month and charge the proper expense accounts. When payment is made this account is charged and closed out and the balance of the pay roll charged in the regular way.

19. Accrued Taxes.

Credit this account with the taxes due up to the end of each month, charging the proportionate amounts to the accounts in which they belong. When the taxes are paid this account will be charged.

20. Proprietor's Drawing Account.

Charge this account with all withdrawals of cash (not salary). At the end of the period the amount of this account is closed into proprietor's capital account.

21. Mortgages Payable.

When a mortgage is placed upon real estate (or assumed at the time of purchase) this account is credited. When paid it is charged.

22. Proprietor's Capital Account.

This account represents the proprietor's net capital. At the end of the period the net profit is credited to this account. The amount of his drawing account is then closed into this account. The balance of the account is his net capital at time of closing.

In the event of a partnership each partner's net capital would be shown in his respective account and the net profit (or loss) carried to the credit (or debit) of their accounts in agreed proportions. In the event of a corporation this account represents the amount of the issued capital stock and the profit or loss is carried to "Surplus" account.

NOMINAL ACCOUNTS.

23. Sales.

Credit this account with the total sales of all merchandise, the charged sales being taken from the total of the charge tickets for the month and the cash sales from the "Cash Sales" column in the cash book. Returns should be charged at selling price for all merchandise returned by customers whether for cash or credit. The difference in this account will be the net sales which is transferred to the credit of "Trading Account."

24—Sales Allowances.

Charge this account with any allowance given a customer not contemplated when sale was made. Allowances should not be charged to "Sales," but closed at the end of the period into "Trading Account."

25. Merchandise Purchases.

Charge this account with the face of the invoices of merchandise before deducting cash discounts. The account is also charged with freight, expressage and drayage on merchandise purchased. Credit the account with any returns of merchandise made to manufacturer or wholesaler and with any allowances for defects in goods received from manufacturer or wholesaler. The balance of the account is transferred to the debit of trading account.

26. Salaries and Wages of Buying Force.

Charge this account with part of salary of proprietor, active partner and manager or buyer and the wages of office force proportionate to the time given to buying. If, for example, the proprietor estimates altogether that he gave one-fourth of his time to buying and three-fourths to selling, then one-fourth should be charged to this account and three-fourths to "Salaries and Wages of Sales Force." Similarly the estimated number of hours a week given by any member or members of the office force to buying should be charged to this account.

27. Miscellaneous Buying Expense.

Charge this account with the travelling expense of buying trips and other expense incurred in buying (not covered by account 26).

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28. Salaries and Wages of Sales Force.
Charge this account with wages and other remunerations of sales persons, order takers and all others engaged in selling, both as regular and extra force; also with the part of the salary of the proprietor, active partners, or manager, and of the wages of the office force proportionate to the time given to selling.

29. Advertising.
Charge this account with all expenditures for advertising purposes, such as space in newspapers and periodicals, space on street cars and billboards, circulars and postage thereon, advertising novelties, trading stamps, charitable donations, window display, electric signs, etc.

30. Miscellaneous Selling Expense.
Charge this account with the cost of wrapping paper, cartons, twine, salesmen's order books, and all other items of direct selling expense not covered by "Salaries and Wages of Sales Force" and "Advertising."

31. Salaries and Wages of Delivery Force.
Charge this account with regular and part time of employees engaged in delivering and with the part of the wages of other employees, whether on sales force or office force, proportionate to the time given to delivery work.

32. Miscellaneous Delivery Expense.
Charge this account with all stable and garage expense, including all repairs, taxes, licenses, upkeep and with the depreciation charged on the delivery equipment; also charge this account with payments for express, parcel post and contract delivery service.

33. Management and Office Salaries.
Charge this account with the salaries of the manager, bookkeepers, office clerks, stenographers and of other general office help not otherwise charged.

34. Office Supplies and Expense.
Charge this account with purchases of stationary of all sorts, account books and forms (except selling and stock forms), typewriter supplies, printing and postage (except advertising), and depreciation on office equipment.

35. Insurance on Stock and Store Equipment.
Charge this account with all expense of insurance, fire, burglary, fidelity, plate glass, employers' liability and other. This account is not to be charged with insurance on store or business property.

36. Taxes on Stock and Store Equipment.
Charge this account with taxes on all stock and store equipment. As taxes are not payable in advance, the amount charged this account must be credited to "Accrued Taxes."

37. Losses from Bad Debts.
Charge this account with the amount that has been reserved for bad debts (4).

38. Miscellaneous General Expense.
Charge this account with heat, light, repairs, depreciation on store equipment and with any items that cannot be charged directly to any of the above particular accounts.

39. Rent.
Charge this account with all rents paid. If the store is owned, rent should be charged equivalent to the amount it could be rented for to others, crediting "Income from Other Sources;" in the latter event, "Income from Other Sources" should be charged with the taxes, insurance, repairs and depreciation on the store.

40. Trading Account.
This account shows the inventory of merchandise at opening and is not touched again until the books are closed. It is then charged with merchandise purchases (25) and sales allowances (24) and credited with sales (23). The inventory at closing is then credited and the balance will show the gross profit on trading. The gross profit is transferred to the credit of the "Profit and Loss Account." The inventory is then brought down as a new balance.

41. Profit and Loss Account (from Trading Operations).
Charge this account with the balances of all the expense accounts and credit it with the gross profit from trading; the difference will be the net profit or loss, which is closed into the proprietor's account; if a partnership, to the partners' accounts, according to their several interests, and, if a corporation, to the surplus account.

42. Interest.
Charge this account with all interest paid and credit it with all interest received and close into "Profit and Loss Account."

43. Cash Discount on Merchandise Purchases.
Credit this account with all cash discount taken on purchases of merchandise. The account is closed into profit and loss.
A record of such discounts available but not taken—cash discounts lost—will be found of use.

44. Rent Income (Net).
If the store is owned, the rent which has been charged to account 39 should be credited to this account and it should be charged with insurance, taxes, depreciation and repairs on store. The account is closed into "Profit and Loss."

45. Miscellaneous Outside Income.
Credit this account with incidental receipts such as toll from telephone pay stations in store, etc.

ITALIAN AUTOMOTIVE INDUSTRY GREATLY DEVELOPED.

The Italian automobile industry during the war has given proof of extraordinary development and is now of great importance. The number of limited liability companies engaged in this industry has increased from 32 on Dec. 31, 1913, to 55 at the end of 1917, while the capital employed has risen from 49,167,000 lire to 195,076,000 lire. The average dividend has increased from 3½ per cent. in 1913 to eight per cent. in 1917.

As regards foreign trade the import of automobiles has declined from a value of 13,531,372 lire in 1913, to 7,729,900 lire in 1917, a falling off of 5,801,472 lire. Exports, however, have increased from 34,180,937 to 115,693,805 lire.

STANDARD PARTS INCREASING WORKMEN.

More men are being put to work at the plant formerly operated by the Hess-Pontiac Spring and Axle Co., Pontiac, Mich., which is now one of the subsidiaries of the Standard Parts Co. As rapidly as supplies arrive the force will be increased until 500 men are employed, which was the normal pre-war force.

DROPS PLAN TO MAKE FORD PLANTS HOSPITALS.

The War Department has abandoned the plan to alter the assembling plants of the Ford Motor Co. in Milwaukee, Wis., and in Des Moines, Ia., into army hospitals.

National Highways Building Must Be Rushed

Secretary of Agriculture D. F. Houston recently told editors of agricultural journals, at a conference held in Washington, that a cooperative highway construction under the Federal aid road act must be resumed as quickly as possible in full measure.

He said that there would be this year about $20,000,000 from Federal appropriations and probably more than this amount from state sources. The states, in addition, will expend sums in excess of what they have assigned, or will assign, for Federal aid road projects.

"It seems to me," said the secretary, "that we should take a further step—take this step not only because of the importance of good roads, but also because of the desirability of furnishing worthy projects on which unemployed labor during the period of readjustment may be engaged. There will be many things suggested for which Federal and state funds will be sought. Some of these will be unworthy. Clearly such public works as roads are worthy, and it would be in the public interest to make available larger appropriations from the Federal treasury to be used separately or in conjunction with state and local support.

"There need be no delay in the execution of such a program. The nation has already provided the machinery in the Department of Agriculture and in the state highway commissions. The Federal aid road act was fruitful of good legislation, and each state in the Union now has a central highway authority with power and funds to meet the terms of the Federal act. The two agencies in conjunction have been engaged in devising well considered road systems and in making surveys, plans and specifications. The task will be one of selection and those roads should be designated for improvement which are of the greatest economic importance, with due regard to such military and other needs as are proper for consideration. There is no necessity for any departure from this scheme. The suggestions made have been canvassed with the President, the secretary of war and the postmaster general, and they are in accord with the view that additional funds should be made available to this department and that they should be expended through existing machinery."

TEXAS HIGHWAY AUTHORIZED.

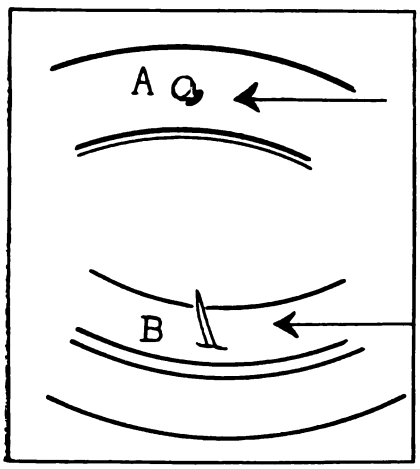
Plans for making permanent the portion of the Henry Axall highway that passes through Navarro county, Texas, have been completed. A committee of Corsicana, the county seat, has returned from Austin, where it was awarded by the Texas State Highway Commission $155,000 for the construction of a concrete highway through the county. Road funds of the county will add $130,000 to this amount.

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CARE OF TIRES MEANS MORE MILEAGE

Careful Examination of Shoes and Timely Small Repairs, and Avoidance of Road Obstacles Will More Than Repay Owners

THE little abuses or neglects in daily use of the car are generally responsible for short tire mileage. As the cost of tires is the largest single item of expense the owner must meet he ought to be keenly interested in whatever may realize him economy. Failure to carry equipment in the car with which emergency repairs can be made may necessitate driving on damaged tire casings, which will often destroy them, or driving on rims and damaging them so they must be replaced.



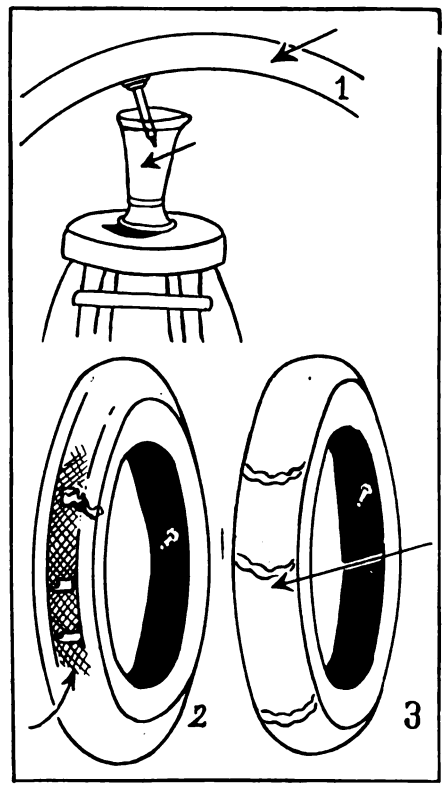
Puncture of Flat Headed Nail Not Readily Noticeable: A, Nail Imbedded in Tread of Shoe; B, Shank of Nail Projecting Into the Interior of Casing.

Contact with the road surface may so roughen or mar a rim that the beads of a new tire put on it may be badly damaged. Misalignment of wheels from bent steering knuckle spindles, or axle shafts, or a bent tie rod, which cause irregular movement of the wheels, are conditions that can be easily determined by owners if they would even casually observe their cars. If these repairs or adjustments are made the wear will be comparatively small. The tires of wheels when not in alignment have a tendency to grind, because there is what may be termed an "eccentric" movement of the treads against the road surfaces, or what may be expressed as combined side slip and direct forward motion at the same time. When a car is driven fast with the wheels not aligned the wear on the tires is in ratio to the effect of speed—that is, it may be regarded as "squared" or four times as great if the velocity is doubled. One can understand that much wear can result from a comparatively short mileage. As there is no measure by which tire wear can be accurately expressed, specific figures cannot be stated, but a tire that is guaranteed for 5000 miles may be practically unserviceable after 250 miles if the wheels were badly misaligned and the road surfaces were very rough.

Cleanliness of Much Importance.

Tools left carelessly on a garage floor may cause damage when a car is driven in or out. Oily floors will cause tire deterioration, for the oil or grease will cause the rubber compound to disintegrate, and when the treads begin crumbling the fabric will quickly be exposed and the shoes will be beyond repair. The need of cleanliness of the floors is highly important, and one should never stand a car where the paving is covered or the ground is saturated with oil.

The treads of tires should be frequently inspected for cuts, punctures and scars of all kinds and sizes, and the air pressure



Some Conditions from Lack of Care: 1, Testing a Valve for Leakage; 2, Worn Excessively from Wheels Misaligned by Bent Spindle; 3, Tread Cut by Tire Chains.

should be tested as often as is practically possible. The tires should always be well inflated, because there is far more damage done by under inflation than by too high pressure. There is hardly one case in 500 tires where the air pressure will be found too high, and in all the others the lack of pressure will cause all kinds of trouble.

Considerable economy can be obtained by shifting the tires from one wheel to another. Those that have been used on the rear wheels and are somewhat worn will afford excellent service on the forward wheels, and there are those who maintain that there is something gained by changing from the right side to the left and vice versa, provided that they are run in the same direction as before, as there is belief that the tire has "adjusted" itself to movement in one direction and reversal of this may result in deterioration. The direction of the tire movement can be indicated by waterproof paint marks, or any other indication that is permanent will serve.

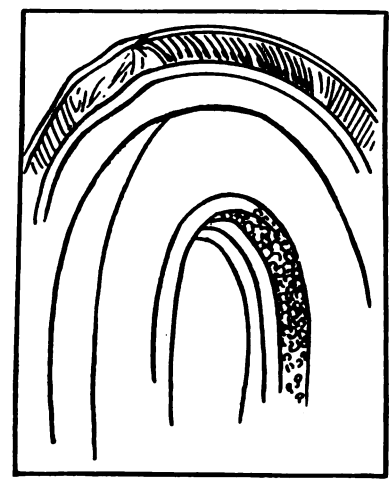
What Careless Driving Causes.

No one should drive so close to the curb that the tires will chafe in driving away. If the car wheels are against a curb the machine may be worked out by hand, as it can be pushed forward or backward and the steering wheel can be turned so that the tires will eventually clear. There is no reason for driving in car tracks unless the roadway is in such condition that more wear would result from driving over it. One might drive on the tracks to avoid a section covered with loose, sharp stones, to illustrate. Tire damage is caused generally by the entire weight of the load being borne by a very small area of the tread. If the rails are wet there is great danger of coming into collision with other vehicles or obstacles, for the brake might be locked and yet the tires would slide on the smooth, wet steel.

Some drivers maintain that a very good plan is to use all spare tires after a certain length of time and give the used casings a rest, which will keep the shoes in better general condition than allowing those kept as spares to harden and lose resiliency from lack of use. Tires are often stored in compartments in roadsters, where they are subjected to more or less heat and are chafed by shifting tools and other articles stored with them. This is obvious carelessness.

If a Car Is to Be Stored.

When a car is not to be used for some time it should never stand on its tires. The car should be jacked, or wooden blocks placed under the axles so that there will be no weight on the shoes. Jacks made purposely for such service, which can be placed under the wheel hubs, can be purchased, and they are well worth the cost. But if one is to store the car for a winter the tires should be removed, the rims cleaned bright with

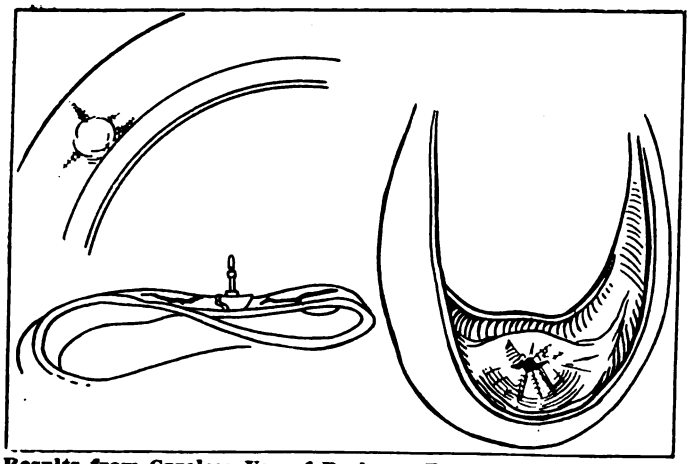


What Good Care Will Obviate: Above, Rim Bent, the Edge of the Flange Being Rough and Destructive of the Tire Bead and Walls; Below, Beads Torn by Rusty Rim.

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emery cloth, and given a coat of black varnish or graphite and shellac to prevent the formation of rust. All small cuts should be vulcanized or repaired and the tire beads given coats of graphite. The tubes should next be inserted in the casings, and the tires should then be placed on the wheel rims and inflated to from 20 to 30 pounds pressure to insure the tubes conforming to the shape of the shoes and prevent folds or wrinkles from forming. After that a test should be made every 30 days, and the pressure brought up to the figure of original inflation if there is any deflation.

When the tires have been inflated the surfaces should be cleaned thoroughly with a cloth saturated with gasoline to remove all traces of grease, oil or dirt, and when the shoes are dry they should be given coats of white tire paint to the rims. This paint is composed chiefly of ground rubber and lithophone and it will keep light, air and moisture from the rubber compound, so there can be no deterioration. The spare tires should be given the same treatment and placed on the rims. If the spares are casings only they can be treated as stated, then wrapped with paper to exclude light and stored in a dry, cool room. They should be kept from heat so far as this is practicable.



Results from Careless Use of Brake or Brake Poorly Adjusted: Upper Left, Bruised by Contact with Stone or Other Obstacle; Lower Left, Tube Torn by Being Forced Into the Rupture in the Shoe; Right, Interior of Casing, Showing Broken Fabric Not Noticeable Externally.

Tests of Brakes a Safeguard.

Another safeguard of tires is to test the brakes occasionally to see if they are equalized. If one wheel locks the car will slide and wear a flat spot on a shoe in possibly one use of the brake. If the ground is rough the treads may be badly damaged. The greatest efficiency of a brake is obtained just before it locks the wheel, and for that reason the brake should be so used that the headway of the car will slacken, but it will not slide or skid on its tires. When braking practically all the stresses are borne by the rear tires. The brakes should be so adjusted that there will be pressure of the shoes upon the drums from the time the pressure is applied to the pedal or lever, and there should be gradual retardation of the vehicle instead of a quick or almost instantaneous clamp that will greatly stress the tires and the entire mechanism of the car. The different results upon the tires can be judged from what has been stated.

Cuts in tires of all sizes should be filled. A cut in the rubber will open under pressure and it will increase in size and depth, picking up sand, pebbles, mud and water, which serve as abrasives and add to the wear until the fabric is reached and is similarly attacked. If the cuts are filled, which can be done by cleansing them with gasoline and putting in a good quality of tire putty, which is prepared by practically all tire manufacturers for this use, they are not to be considered seriously. If the cuts are of considerable size they should be vulcanized. One could use a portable vulcanizer to good advantage, do much of this work and save the cost, for the expense of the material is trifling and a vulcanizer will serve for years. Many a good casing has been neglected and loss experienced by owners who are unwilling to do work on tires, or lack confidence to undertake repairing.

Spare tires carried on cars can best be protected by covers that can be purchased from any dealer, which will keep them from light and prevent deterioration that comes from exposure. A tire not used that is left in the light will become hard and will lose resiliency and crumble under pressure and tractive effort. The tubes should be carefully folded, wrapped in paper and cloth to prevent chafing, or they can be carried in fabric cases that will keep them from damage. Tubes should not be placed where they will be worn by contact with other articles. They should be useful for several years if given reasonable care, and can be changed from one tire to another as often as desired. Cleanliness and care will reduce the tire bill of the average car owner from 10 to 50 per cent.

AIRCRAFT EXPOSITION FOR NEW YORK CITY.

An aircraft exposition will be held in New York, Feb. 27 to March 6, both dates inclusive, and Madison Square Garden has been engaged for this purpose by the Aircraft Manufacturers' Association.

It is planned to make the exhibit truly international in character. There will be exhibits of various American and Allied military airplanes, as well as exhibits of engines and accessories.

The show has been made possible by the revocation of the presidential proclamation forbidding aircraft exhibitions as inimical to the best interests of the country during the war.

Must Utilize Trucks To Supplement Railroads

The improvement and construction work that will reach mammoth proportions next spring and summer will require motor trucks by the thousands, predicts G. A. Kissel, president of the Kissel Motor Car Co., Hartford, Wis. He believes that motor trucks will continue to help relieve the railroads transporting goods, merchandise and freight for some time to come. This, he says, is indicated by the big corporations manufacturing railroad freight cars accepting orders from different countries abroad. Mr. Kissel made the following statement:

"Without a doubt the American railroads could easily use the total output of American freight car manufacturers to replenish their freight carrying equipment. Since we entered the war our freight rolling stock has seen strenuous use. Through the scarcity of labor they have undoubtedly not had the customary inspection and repair attention as in normal times.

"The rolling stock of such countries as England, France, Italy and other countries has been practically annihilated through constant usage. It is of the utmost importance to facilitate the reconstruction work 'over there,' which means an unlimited supply of freight cars. These countries will no doubt be supplied with rolling stock as soon as possible. In fact, I understand that recently one of the big freight car manufacturers has accepted over $30,000,000 of export orders, calling for thousands of freight cars for Italy and other countries. This will undoubtedly make it necessary for the American railroads to continue the use of old stock as long as possible, which, as experience has proven, is not equal to the transportation requirements of the country. Hence the motor truck will be called upon to make up the difference.

"While the motor truck has thus proven a Godsend to the railroads, it must be remembered that the business and industrial world can use every truck that is available and more. There is a shortage right now in all lines of manufacturing, not mentioning the thousands of tons of agricultural produce that depends on the motor truck for transportation to market."

DORT EMPLOYEES SHARE FUND OF $40,000.

At a Christmas dinner of employees of the Durant-Dort Carriage Co. in Flint, Mich., 111 employees who had worked continuously in the company's service for six years or more shared in a bonus of $40,000, the checks passed out ranging from $50 up to more than $2500. Distribution was made under what is known as the "Loyalty and Merit" plan, which was originated by J. D. Dort, president of the company. Three hundred employees attended the dinner.

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UNITED STATES MUST WATCH NEW ZEALAND MARKET.

Alfred A. Winslow, American consul general in Aukland, reports that the motor car, motor bicycle and tricycle trade in New Zealand has fallen off materially during the last two years, and will doubtless continue at a lower rate as long as the exceptionally high prices of benzine, gasoline, etc., continues.

However, motor cars are being put to more practical use in the country than ever before, since farmers are using them extensively for different kinds of work about the farm and in transport wherever it is possible, using such attachments and improvements as are now on the market to adapt them to different kinds of work.

The high water mark was reached in 1916, when the number of cycles imported was 2287 and the number of motor cars 6174. In 1914 motor bicycles and tricycles were nearly all imported from the United Kingdom, while in 1917 a large majority of them came from the United States. This is largely true in regard to motor cars, but not to the same extent, for in 1914 there were 1093 motor cars imported from United Kingdom, as compared with 72 motor cars in 1917, while from the United States there were 1308 imported in 1914, as compared with 3596 in 1917.

These favorable conditions enjoyed by American cars and motorcycles cannot be expected to continue after the closing of the war, and American manufacturers and exporters will need to look carefully after the trade in this part of the world.

SAMPLES OF CRUDE PLANTATION RUBBER FOR INSPECTION.

Consul G. L. Logan, Penang, Straits Settlements, has forwarded to the Bureau of Foreign and Domestic Commerce samples of crude plantation rubber, graded in accordance with the classifications in use there, as follows:

Unsmoked diamond sheet, smoked diamind sheet (light), smoked diamond sheet (dark), unsmoked plain sheet, smoked plain sheet, pale crepe (variable), brown crepe (variable), blanket crepe (variable).

These samples may be examined at the Bureau of Foreign and Domestic Commerce or its district offices by referring to file No. 108,614.

OVERLAND BUILT 100,000 CARS DURING WAR.

Willys-Overland, Inc., Toledo, built 100,000 Overland cars during the war period. The "war contracts" totaled $80,000,000, and in order to take care of these $12,000,000 was spent for new buildings and equipment.

REO FIGHTERS GET OLD JOBS.

The Reo Motor Car Co., Lansing, Mich., announces that all of the 812 men who left its employment to enter the army or navy will get their old jobs back.

Canada Plans Many Extensions of Highways

In all the principal agricultural sections of Canada farmers own automobiles invariably, according to Ernest Godfrey, editor of the Dominion Bureau of Statistics. He predicts that there will be a further continuous increase in the number of these vehicles, as the movement for better roads is being actively prosecuted. He points out that during the last parliamentary session legislation to facilitate the provision of better roads was placed on many of the provincial statute books.

Mr. Godfrey states that during the last few years there has been a big increase in the registration of automobiles in Canada. Four years ago, during the first year of the war, he states, the number registered throughout Canada was 69,598, whereas in 1917 the number was 197,799. The number is largest in Ontario, where in 1917 there were 83,308 motor vehicles registered as compared with 31,724 in 1914. Saskatchewan, the next largest agricultural province, has 32,505, as compared with 8020 in 1914.

The number of establishments classed as manufacturing automobiles in Canada during 1917 was 11, besides there were 24 establishments manufacturing automobile accessories and 497 engaged in repair work, according to a report issued by the Dominion government.

The total capital invested in these industries in 1917 was $35,780,677, comprising $28,192,858 in automobiles, $3,155,893 in accessories and $4,431,926 in repair shops. The number of persons employed was 9418, of whom 563 were females. The total amount paid to them in wages was $9,239,952.

The total number of cars recorded in the census returns was 89,676, of which 80,544 were touring cars, 5502 runabouts, 1165 closed cars, 1231 delivery wagons, 561 roadsters, 117 trucks and 556 not classified.

The road building program for Canada has been placed in the front rank of the public construction work approved by Hon. F. S. Carvell, minister of public works, and Hon. J. A. Calder, minister of immigration. Completion of the transcontinental highway, extending from Moncton on the Atlantic to Vancouver on the Pacific, most of which has already been built, but needs to be linked together by stretches across the Rockies and in parts of the high lands of Ontario is promised.

A new tourist highway from Edmonton westward into the Rockies to Jasper Park, and eventually clear through the Prince Rupert, is announced from Edmonton, while roads into the north country of the three provinces, Manitoba, Saskatchewan and Alberta, is provided for in new legislation before the provincial parliaments.

The Reo Motor Car Co. has voted a 2½ per cent. quarterly dividend for stockholders of record Dec. 14.

ROAD BUILDING TO COST IOWA $50,000,000?

A determined fight for good roads in Iowa was expected with the opening of the session of the Iowa Legislature in January. Representative Nebiker of Burlington has completed the draft of a bill which he will introduce. The bill would do away with the present state highway commission and create a state highway department with headquarters in Des Moines. The department would be headed by a commission of three men appointed by the governor and with powers far outreaching those of the present commission.

There would also be a highway engineer and an assistant highway engineer with salaries of $4000 to $2500 a year respectively. Salaries of the commissioners are set at $3500 a year.

The bill proposes to create a state wide system of 17 roads, to be constructed of "durable, hard surfaced materials." To finance this Mr. Nebiker would issue state bonds to the amount of $50,000,000 to draw from 3.5 to 4.4 per cent. interest and to be issued for 20 years. Direct taxation and use of the motor vehicle license fees would take care of the interest and principal at maturity.

GENERAL TIRE CAPITAL INCREASE APPROVED.

At a recent meeting of the stockholders of the General Tire and Rubber Co. action of the board of directors to increase the capital stock from $1,000,000 to $2,500,000 was approved by the stockholders.

W. O'Neil, vice president and general manager, stated: "Sales for 1918 are $3,000,000, an increase of 125 per cent. over the previous year. We anticipate doubling this volume in 1919, and reaching $6,000,000 net sales."

A special stockholders' meeting was held Jan. 30 and voted to increase the capitalization. The additional capital will be used for new buildings and machinery to greatly increase production.

The stockholders elected the following directors: M. O'Neil, W. O'Neil, T. F. O'Neil, W. E. Fouse, G. F. Burkhardt, W. L. Beckley and J. A. Diebolt.

The following officers were re-elected: president, M. O'Neil; vice president, W. O'Neil; secretary, W. E. Fouse; treasurer, Charles Herberich.

STUDEBAKER WILL MAKE DELIVERIES MARCH 1.

The Studebaker Corporation will be able to make regular deliveries on its line March 1. The plant at South Bend, Ind., is gradually being converted back to a peace time basis. The line embraces the light four at $1125; light six, $1585; big six, $1985; light four sedan, $1685, and light six sedan, $2185.

The New-Way Motor Co., Lansing, Mich., has been granted permission to increase its capital stock from $500,000 to $750,000.

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TURNER SIMPLICITY TRACTORS

One Chassis Design Equipped with Two Sizes of Engines—Automobile Type Construction and Control Are Features.

STANDARDIZATION of design has been the policy of the engineers of the Turner Manufacturing Co., Port Washington, Wis., a concern that builds Turner-Simplicity tractors. The machines are rated as 12-20 and 14-25, and they are identical save for the engines. The engine of the 12-20 is a Waukesha with cylinder bore of 3¾ inches and stroke of 5¼ inches, and the 14-25 is engined with a Buda construction with cylinder bore of 4¼ inches and stroke of 5½ inches. Obviously there is variance in power. The 12-20 engine is rated at 22.50 horsepower by the S. A. E. formula, and the claim of the maker is that it will develop 30 horsepower at 1200 revolutions. The Buda engine is the well known model HU, which was adopted by the United States government for its class A trucks, and was built in large numbers outside of the Buda factory for government use only. This engine will develop 34 horsepower at 1000 revolutions, 39 horsepower at 1200 revolutions, 44 horsepower at 1400, 49 at 1600, 51.50 at 1800 and 52 at 1850.

The two chassis are the same in dimensions and proportions of all parts and are practically interchangeable. The construction of the engines necessitate variance in connection of linkages, etc., but the control members are precisely the same in both. For this reason when both engines have been sufficiently described the one description of the chassis will apply to both machines. In connection with this standardization of design and construction statement should be made relative to the policy of the company.

Machines to Meet Any Requirement.

The object is to have machines which will be sufficiently varied in power to meet any wide difference in work conditions. That is, the 12-20 can be used with two 14-inch plows in practically any soil, and can be relied upon to give satisfactory results with three plows in lighter or sandy ground. The 14-25 tractor can be depended upon to haul three plows in any soil and four in average conditions. The use of two engines does not complicate the service department. In fact, quite as good service can be afforded with two as with one. Not only this, both engines are standards of the automotive industry and adjustment, repair or restoration can be undertaken by practically any shop that does general power vehicle repairing.

The design of the tractor chassis can be said to follow closely to power vehicle construction, and the majority of the units are produced by specialists. The engineers of the Turner company have adapted these for tractor use and combined them into machines that are maintained from the viewpoints of accessibility for adjusting, maintaining or restoring to justify the name of "Simplicity."

The Waukesha Power Plant.

The Waukesha engine is a type developed for truck and tractor service and is intended to afford satisfactory result where the work is heavy. The cylinders are cast in pairs from the best semi-steel with the water jackets integral, the jackets being cast open, this insuring uniformity of cylinder and jacket walls and ample, clear water chambers. The heads of the jackets are covered with large



L. M. Turner, Vice President and General Manager, Turner Manufacturing Co., Port Washington, Wis.

plates retained by series of cap screws. Much care is taken in production and the cylinders are tested five times during manufacture to insure against defects. The pistons are cast of the same material as the cylinders and these are fitted with three quarter-inch rings each.

The crank case is cast in two sections from aluminum copper alloy, there being a central vertical transverse web that carries the center main bearing. There are forward extensions of the sections that with a cover house the timing gearset, and the support arms are integral with the upper section. The rear part of the lower section is the oil reservoir.

The crankshaft is drop forged from chrome nickel steel and is finished and heat treated to have a tensile strength of 140,000 pounds to the square inch and an elastic limit of 118,000 pounds to the square inch. It is a three-journal type, two inches diameter, and the journals are 2⅜, 3¼ and 3⅝ inches length from front to rear, and a total length of 9¼ inches. The crankpins are two inches diameter and 2½ inches length. The crankshaft is drop forged from special steel with the cams integral and this is very carefully machined, case hardened and ground. The shaft diameter is 1¼ inches.

Other Constructional Details.

The connecting rods are heat treated steel drop forgings and the wristpins are steel tube, case hardened and ground. The timing gears are helical and are large diameter and have wide faces. The valves are nickel steel, a taper type with flat case hardened ends, and the tappets are a roller type, with adjusting screws and nuts that operate in renewable guides. The valve mechanism is fully enclosed by cover plates that are easily removable.

The engine is cooled by a circulation of water through a centrifugal bronze pump with brass piping, a large Perfex radiator and the cylinder jackets, and radiation is promoted by a fan on an adjustable bracket, having a ball bearing, driven by a flat belt from an extension of the water pump shaft. The engine is lubricated by what is known as the Waukesha automatic splash system, claim being made that the connecting rod scoops establish the level of the oil in the troughs in the base of the crank chamber regardless of the position of the engine. The engine is also equipped with the Waukesha governor, which is adjustable as to speed and may be sealed. This governor is self-lubricated.

The Buda Type HU Engine.

The Buda engine cylinders are cast from gray iron en bloc with the water jacket integral, the head of the water chamber being open the entire length of the block. The water jacket and cylinder walls are carefully proportioned to obtain uniform thickness and insure cooling and lubrication efficiency, and the water chambers are thoroughly cleared so that there is positive freedom of circulation. The intake manifold is cored into the block, this insuring the fuel being heated. The head of the block has a central channel, increasing in depth from the rear to near the forward end, this being intended to direct the movement of the water. The outlet from the head is unusually large. Much care is given to machining and finishing the block. The pistons are cast from gray iron and these are grooved for three diagonally split rings, and there is a series of oil holes at the base of the lowest groove to insure equal distribution of the lubricant on the walls of the cylinders and that the excess of oil is carried off into the interiors of the pistons.

The crank cases are cast from gray iron, these being in two sections, the upper half having a vertical central transverse web that supports the center main bearing and the lower half is the base of the crank cramber and the oil reservoir. There are forward and rear extensions that house the timing gearsets and the flywheels. The rear support arms are formed integral with the upper section.

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Turner Simplicity Hauling Two 14-Inch Plows, Showing the Work Practical in Heavy Soil.

The Reciprocating Members.

The crankshaft is drop forged from a special-quality of steel with the flywheel flange integral, and it is machined and ground to dimensions. It is a three-journal type with diameters of 2⅛, 2¼ and 2⅜ inches at the journals from front to rear, and lengths of 3⅛, 2¾ and four inches, the total length being 9⅞ inches. The crankpins are 2⅛ inches diameter and 2⅛ inches length. The camshaft is drop forged from a special steel with the cams integral. This is machined, case hardened and ground to dimensions. The connecting rods are drop forged steel I sections, heat treated, and the wristpins are steel tube, case hardened and ground. The main and connecting rod bearings are babbitt metal in bronze cages and the camshaft bearings and the bushings of the small ends of the connecting rods are phosphor bronze. The connecting rod caps are retained by four nickel steel bolts each, and these and the main bearings are adjustable with shims. The timing gears are helical cut, having wide faces and large diameters, and the use of thrust screws prevents end play of the gears and shafts after considerable use.

The valves have cast iron heads electrically welded to steel stems, and these operate in long guides. The valve tappets are a mushroom type with adjusting screws and lock nuts that are fitted in renewable guides. The entire valve mechanism is enclosed by cover plates that are easily removable.

Lubricating and Cooling Systems.

The lubricating system is a full force feed, a positive pressure being insured by a regulating valve. The lubricant is drawn from a screened well in the reservoir by a gear pump and forced through tube to the main bearings and thence through drilled channels in the crankshaft to the crank pins, and thence through tube to the wristpins. The camshaft bearings and the timing gearset are lubricated by oil forced through ducts in the crank case connecting with the main distribution pipe of the system. The cylinder and piston walls and the cams and valve tappets are lubricated by oil distributed by the centrifugal motion of the crankshaft. The oil is forced through the system at 40 pounds pressure at 1000 revolutions of the engine.

The engine is cooled by a circulation of water forced by a centrifugal pump, having a bronze runner and bronze bearings, through the cylinder jackets and Perfex radiator, the radiation being promoted by a large fan mounted on a ball bearing on an adjustable bracket on the forward end of the cylinder block that is driven by a flat belt from a pulley on the forward extension of the water pump shaft.

General Engine Equipment.

The engines are both equipped with Dixie high tension magnetos with impulse starters, and the fuel is supplied through model L Kingston combination kerosene carburetors that are equipped with air heaters and water feeds, the intakes of which are fitted with Bennett air cleaners to prevent dust being drawn into them.

The engine clutches are an expanding shoe type that are entirely enclosed, the clutch shafts being equipped with ball bearing collars. The faces of the shoes are covered with raybestos. The clutch action is claimed to be positive, but very easy. The transmission gearsets are a selective sliding gear type, having two forward speed ratios and reverse, the forward speeds being 1¾ and 2¾ miles an hour. The shafts and gears are large, the gears being cut steel, heat treated and hardened, and the shafts are mounted on Hyatt roller bearings with annular ball thrust bearings. The gearset is enclosed in an oil and dust tight case and runs in a bath of oil. The differential gearset is a bevel gear type, fully enclosed and running in oil.

The wheelbase of the chassis is 80 inches, the overall length 128 inches, the tread 48 inches and the height 60 inches. The turning radius is 80 inches. The chassis are driven by the rear wheels by bull pinions and gears. The frame is constructed of six-inch pressed steel channel section, with heavy cross members reinforced with gussets and braces, and it is assembled by hot riveting. The forward end of the frame is mounted on heavy helical springs, but the rear end is carried by the rear axle with spring suspension. The forward axle is an automobile type, fitted with heavy steering knuckles that are controlled by the usual linkage, and the relation of the axle with the frame is maintained by a triangular radius rod, the ends of which are fixed to the axle and the center of which is secured to a hanger of the frame.

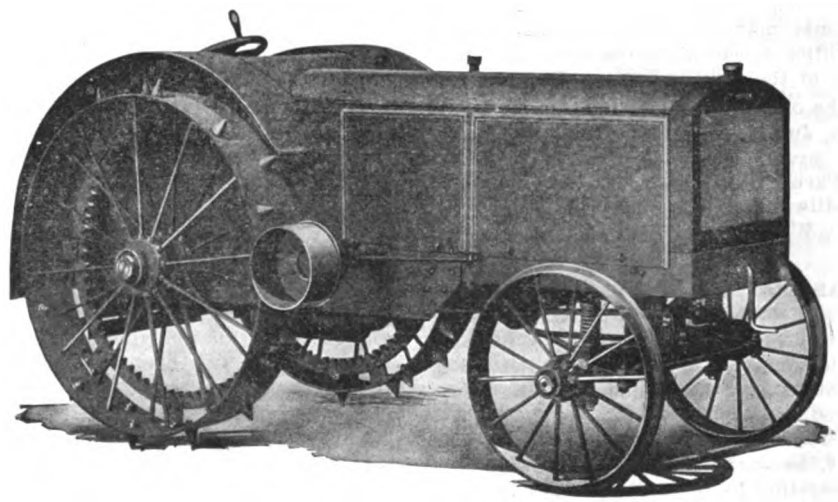
Automobile Type Steering Gear.

The steering gear is an irreversible cut steel worm and gear type operated by a large hand wheel and the control members consist of a single hand lever for gear shifting with ignition and fuel control levers. The control for changing the fuel from gasoline to kerosene or vice versa is located on the dash. The clutch is operated by a lever. The brake consists of two independent units, operated by foot pedals, each operating on a rear wheel, so that either or both wheels can be retarded at will, or these may be operated practically as a differential lock so that there may be power applied to both wheels should there ever be loss of traction by one wheel. This is claimed to be an insurance against stalling in the event of one wheel losing traction. The front wheels are 30 inches diameter with six-inch rims and the rear wheels are 54 inches diameter with 10-inch rims and these are mounted on roller bearings on a dead axle. The belt pulley is located at the right side of the chassis frame and this is 14 inches diameter, with seven-inch face. It is flange mounted and is easily removable. It is controlled by the main clutch lever in the cab. The normal speed is 600 revolutions a minute.

The fuel supply is carried in two tanks, the gasoline tank having five gallons capacity and the kerosene tank 15 gallons capacity. The drawbar is an adjustable swinging construction, having a low hitch and a pivoted starter. The drawbar pull of the 12-20 tractor is 2000 pounds at fast speed and 2900 pounds at slow speed, and the draft of the 14-25 tractor is 2600 pounds at fast speed and 3500 at slow speed. The weight of the 12-20 tractor is 4000 pounds and the 14-25 tractor weighs 4300 pounds.

The Growth of the Company.

The Turner Manufacturing Co. was established by Messrs. Schumacher & Johnson, at Port Washington, Wis., in 1872 under the name of the Western Gray Iron and Malleable Iron Casting Co., and produced light gray iron casting and



Turner Simplicity Tractor, This Showing the General Appearance of Either Size, the Only Difference Being Evident When the Hood Is Lifted.

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hardware. Six years later the concern was placed under the management of H. W. Lyman until 1889, when it was acquired by the Turner interests, and in 1898 the company removed to Milwaukee. The company then began the manufacture of gasoline farm engines, a small department being devoted to this. The engines were first built as single units and the demand for these increased rapidly, so the engine division became a very important part of the business.

In 1908 the company decided to relocate at its original plant at Port Washington, where more extensive manufacturing facilities were available, together with closer farm community contact, which was believed desirable for the expansion of the farm engine department. The engine division increased so that it greatly exceeded the foundry work, and eventually the foundry was given over and the company concentrated on the production of farm engines of varying types. Then it was that the name was changed to the present title from the fact that it in no way designated the activities of the concern.

Began Tractor Production in 1915.

The company had established a very large organization for distributing Simplicity engines, and in 1915 it began the manufacture of tractors. This division has been very well developed and more than 300 of these machines are in use on American farms today. In reference to the company and its progress Vice President and General Manager L. M. Turner states:

"Our growth has been steady and conservative. We have been thorough in our engineering to make sure that we were right in every detail before one penny of our money was put behind one item. We have not attempted to jump into the limelight of the industry by spectacular methods, but have preferred to move along cautiously and judiciously to our ultimate goal, providing for our needs only to the extent that in our judgment was necessary.

"In 1898 we increased our capitalization from $25,000 to $100,000. In 1912 it was again increased to $150,000, and in 1917 it was again increased to $250,000. Now it has been increased to $1,000,000, which has been necessary to provide additional manufacturing and distributing facilities essential to the successful conduct of the tractor business."

The officers of the company are: President, Judge W. J. Turner of Milwaukee; vice president and general manager, L. M. Turner; treasurer, Jackson B. Kemper of Milwaukee; secretary and sales manager, W. J. Niederkorn.

ALABAMA ONLY STATE NOT ASSENTING TO FEDERAL AID.

Alabama is the only state that has failed to give the legislative assent required by the Federal Aid Road Act. The governor has assented, on behalf of the state, as authorized by the act, so that cooperation by the state has not been affected adversely.

A. E. F. Trucks and Cars Totaled 77,549 to December 1

There were 110,911 motor vehicles, including motor trucks, passenger cars, ambulances, motorcycles, bicycles and sidecars, shipped by the Motor Transport Corps of the United States Army to the American Expeditionary Forces from the beginning of the war to Dec. 1, 1918. Of these 1196 were lost at sea.

In the class A division 5214 trucks were shipped, 10 of them being lost. This class included White 1½-ton, Pierce-Arrow two-ton, Garford 1½-ton, light aviation 1½-ton, White non-standardized 1½-ton and Packard 1½-ton types. There were also 18,986 class B types, three to five-ton sizes, shipped, including 6458 standardized class B trucks known as Liberty trucks. Of these 160 were lost at sea.

In addition to the standardized class B truck the class B includes heavy aviation three-ton, Packard three-ton, Mack 3½-ton, Riker four-ton, Pierce-Arrow five-ton, Mack 5½-ton, White three-ton, White five-ton and Packard five-ton types.

There were 15,468 tons of spare parts shipped, none of these being lost. Ambulances shipped included 4219 Fords, 3239 G. M. C.'s and 249 miscellaneous. In all 46,636 trucks of all types were shipped, with 361 lost at sea. This number included 6712 Ford light delivery trucks, 1391 Dodge Bros. light repair trucks, 11,239 class AA trucks under 1½ tons, in which class were the G. M. C. ¾-ton, Commerce one-ton, White one-ton and Ford ¼-ton.

In all 2110 Fords, 3183 Dodge Bros. and 1420 Cadillac passenger cars were shipped, a total of 6713, of which 26 were lost at sea.

OHIO ROAD BUILDERS AND ENGINEERS TO MEET.

Post-war problems are to be discussed at length at the second annual road congress of Ohio, in Columbia, Jan. 14-16, under the auspices of the Ohio Good Roads Federation. At the same time the annual meetings of the Ohio Good Roads Federation, the Ohio Engineering Society and the County Commissioners' Association of Ohio will be held.

IMPLEMENT IMPORTS NOT NOW RESTRICTED.

The War Trade Board has removed agricultural implements from the lists of restricted imports. Licenses may now be issued, when the applications are otherwise in order, for their importation when shipped from any primary or overseas market.

A. W. Tyler has been elected vice president and general manager of the C. A. S. Products Co., Columbus, O., to succeed the late James W. Graham.

"DEMON TRUCK" THAT DROVE AT "40 AN HOUR."

A Pennsylvania motorist in a letter to the Goodyear Tire and Rubber Co., which operates a motor express line between Akron, O., and Boston, Mass., testifies to "motor hauling at 40 miles an hour." His letter states:

"As I turned on to the Lincoln Highway I heard a horn and glancing back saw it came from a truck, and wondered what the driver meant, as I was then going about 25 miles an hour. I gave my car a little more gas and kept out of his way, but every time I slowed down for turns and railroad crossings your truck was right behind me. I was at no time going less than 25 miles an hour and most of the time was traveling 40 and better all the way in.

"Living on the Lincoln Highway, I have often seen your trucks pass my home and have commented on the absence of any vibration of my house when your trucks pass, as compared with the vibration caused by heavy solid tired trucks. But the full benefit of the big tires with which your trucks are equipped was not brought home to me until one of them chased me into Philadelphia, which was to me a very interesting incident of my trip."

BUILD GOOD ROADS, GOV. ALLEN.

"Build good roads" is the tip Governor Henry J. Allen of Kansas gives to politicians who seek the soldiers' votes.

He said that while the men would return from France with the usual diversity of opinion on political subjects, they would come back with a single mind on the subject of good roads.

"The men of the American Expeditionary Force," he declared, "firmly believe that the good roads of France won the war."

EMERSON-BRANTINGHAM SCHOOLS FOR TRACTOR DRIVERS.

Tractor schools of the Emerson-Brantingham Implement Co. of Rockford, Ill., have already been opened. They are being conducted by Emerson-Brantingham dealers in their own towns under the direction of the adjacent branch of the company. Men especially trained at the home plant for this work are serving as instructors.

MANY TRACTOR EXHIBITS FOR TOLEDO, O., SHOW.

A great increase in the number of tractor exhibits were assured at the 11th annual Toledo power vehicle show, Jan. 27-Feb. 1. Passenger cars, accessories, trucks and tractors were shown. The Toledo Auto Show Co. staged the exhibition. Hugo V. Buelow was again manager.

The Eugene F. Lalley & Sons Co., Boston, Mass., has been made New England distributor for the Triangle Motor Truck Co.

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HIGHWAYS TRANSPORT ECONOMIES

THE Highways Transport Committee of the Council of National Defense has impressively demonstrated the need for highways spanning the country in all directions, and so constructed and handled as to meet the imperative needs of the post-war situation in the United States.

Development of the provinces of the Highways Transport Committee was to the end that the highways themselves might carry their share of the burden of war, and in the most efficient manner possible. This has resulted, however, in the energizing of the highways and in the encouragement of rural motor express development, which operates to bring the producer of foodstuffs and the consumer in such close touch as to revolutionize the transportation situation wherever these lines are in existence.

This committee has suggested and has aided in the establishment of Return Load Bureaus, with the result that conservation of man power, machinery and the highways has been effected to a marked degree. These bureaus, located in centers of traffic, have assisted the truck operator in obtaining loads both ways, and through them an immense amount of short haul traffic unprofitable to the railroad and needlessly congesting it has been diverted to the highways.

Cooperation with the inland waterways of the country has been brought about by supplying the link necessary to complete the chain of transportation between the wharf and the point of destination of the commodity through efficiently operated transport over the highways.

As a result of combination between operators of motor express routes and the electric railways, the two have been able to work to mutual advantage, since the development of new territory has added a very material tonnage to the haulage on the electric lines.

The State Highways Transport Committee, through organizations extending down through the state and the district to the county, have been enabled to spread the gospel of the best possible use of all forms of highways transport, which, to be practical, means in the final analysis properly constructed and intelligently regulated highways radiating throughout the country.

In a concrete way some of the results which have been accomplished by the Highways Transport Committee of the Council of National Defense in the few months of its existence are as follows:

It has aided the War Department materially in the removal of snow from highways over which convoys of motor trucks destined for overseas moved during the winter of 1917-18.

It has paved the way, through its organization extending into practically every state in the Union, for materially aiding the great readjustment program which the government is now entering, particularly by indicating the fields which are most capable of development through a more efficient scheme of transportation.

The various state committees have put themselves back of bond issues and other good roads campaigns in various states, and have furnished striking evidences of the material good to the community and country resulting from efficiently handled highways transport, while driving home the importance of intelligent direction of the highways of the future.

It has pointed the way, through utilization of the rural motor express, the return load bureaus, etc., for the conservation of a great part of the 50 per cent. of perishable foodstuffs which have gone to waste in the past because, upon the authority of Food Administrator Herbert Hoover, no adequate means of transportation has been available to get these foodstuffs from the producer to the consumer while in desirable form for use.

It has been the medium of stimulating fast express freight service through working arrangements between motor trucks and electric lines which operated to relieve the steam roads of the undesirable short haul.

It is driving home to the people the impressive testimony developed four years ago by a congressional investigation to the effect that the nation was suffering a loss of more than $500,000,000 yearly because of bad roads.

Its organized campaigns in the states and even in local communities are visualizing to the farmer the waste of bad roads and the economic value of good roads.

It has carried to remote sections of every state of the Union the message of Chairman Edward N. Hurley of the United States Shipping Board, in which he asked for the assistance of the committee in moving over the highways to seaboard shipping points the food supplies destined for the relief of the stricken peoples of Europe.

It has harkened to the earnest plea of Food Administrator Hoover for support for rural express lines as one of the most potent agencies in solving the food problems of this country and those of the Allies.

It has successfully sought to enable the farmer to make the most efficient use of his acres and of his time by availing himself of modern highways transportation, which means for him a full day on the farm while the rural express operator markets his products and carries home his merchandise.

MOTOR EXPRESS WILL CREATE DEMAND FOR GOOD ROADS.

The motor express will put the city family in direct touch with the farm, cut out a good deal of the middleman's profit, and bring down the cost of living, says A. C. Burch, vice president and sales manager of the Clyde Cars Co., manufacturer of the Clydesdale motor trucks. Mr. Burch believes that the present development of a network of rural motor express lines throughout the country will be of immense help towards the establishment of good roads.

"Heretofore," says Mr. Burch, "the chief obstacle in the way of building roads has been the fact that only a small percentage of the population has been vitally interested in it. The city dweller hasn't been a real enthusiast because good roads haven't seemed to directly affect his everyday life or his pocket book. About the only time he has had cause to complain over the roads is on an occasional motor car trip during the summer.

"The residents of the small towns and villages have been more interested. But many of them have not been able to see how the benefits they would derive would be worth the increased taxes. The farmers have, of course, been enthusiastic good road boosters, but even here the sentiment has been divided. The unprogressive farmers who have only had short hauls to make to market have been more afraid of the increased taxes than they have of the poor roads.

"I believe, however, that the rural motor express line will do more towards bringing all of these classes to a realization of the necessity of good roads than any other influence. The motor express will bring the towns and villages into closer contact with the big cities—reducing shipping costs and delays. And best of all, it will give every farmer a direct outlet for his products and enable him to sell where he can get the highest market price. Good roads are just as vital to the rural motor express lines as rails, ties and the road bed is to the railroads. By concentrating the influence of every class in cities, towns and farms toward the good roads movement through this interest in the motor express lines, I believe we will soon be able to throw a net work of good roads throughout every section of the country."

BRUSKE RETURNS TO AGENCY WORK.

Paul Hale Bruske, who for two years has been advertising director for the Harroun Motor Corporation, Wayne, Mich., has returned to the Power, Alexander & Jenkins Co., advertising agents. Mr. Bruske will continue to supervise the Harroun advertising and will also direct advertising campaigns for a number of Detroit manufacturers.

MAY "SCRAP" 500,000 SHELLS AT OVERLAND PLANT.

At the Willys Overland, Inc., plant in Toledo there are 500,000 unfinished eight-inch shells. These were sent to the Overland plant to be machined. It is probable that they will be scrapped. Each weighs 160 pounds, so that it may mean putting 80,000,000 pounds of shells in the junk pile.

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GRAPHICS



Police car imitators are now being sought in New York City and trouble is brewing for those overshrewd automobile owners who have been enjoying immunity from traffic cops because of a display of police department signs on the front and rear ends of their motor cars.

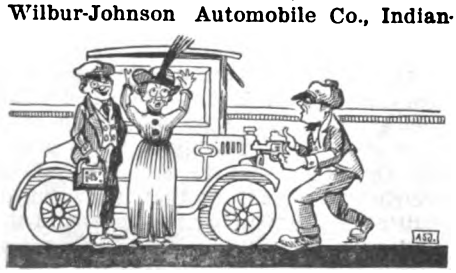
Instructions have been issued for the police to jot down the license numbers of all automobiles bearing the "P. D." insignia. These are to be checked at police headquarters and any cars not owned by the department or its special deputy commissioners will immediately be traced and their owners arrested.

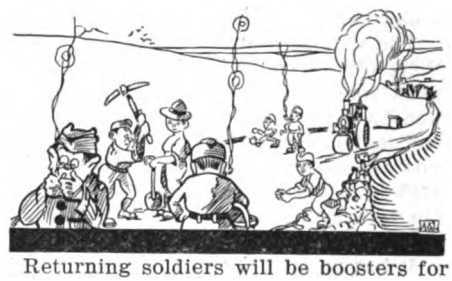


Any person seeking a motor vehicle driving license in Newark, N. J., must take a practical test to determine the applicant's ability to properly operate an automobile or motorcycle, coupled with a written examination to show applicant's knowledge of the motor vehicle and traffic acts and mechanical construction of motor vehicles. Applicants must obtain a percentage of 70 to qualify. Previous to examination one may obtain a three weeks' permit. Applicants failing to pass may have their temporary permits extended pending preparation for a new examination.

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When Miss Grace Love, cashier for the Wilbur-Johnson Automobile Co., Indianapolis, and a young man, who was employed by the company as a salesman, were driving from a bank to the company's office with the company's weekly pay roll, amounting to $537, their car was entered by a man who told them he was being pursued by the police and who, at the point of a revolver, ordered the salesman to drive on. After they had reached a lonely spot the intruder ordered the car stopped and compelled Miss Love to alight. He took from her the pay roll. He leaped into the car and had the salesman drive him away. The salesman denied that he was in the robbery plot, but he and another man were arrested and charged with the crime.





Returning soldiers will be boosters for good roads, is the prediction made by Col. Robert H. Tyndall of the 150th Field Artillery in a letter from France to his fellow Hoosier, Chairman Carl G. Fisher of the A. A. A. Touring Board. The letter states: "There will be a couple of millions real road boosters back in the United States when the war is over, as I think all of the men over here appreciate how good roads can be made invaluable. In my mind there is no doubt that the good roads of France saved her in two instances. One of the great things they do over here is to repair a road and even make an entirely new surface without interfering with the stream of traffic."

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Use of motor trucks as a means of solving problems of mail and freight distribution throughout the United States was advocated by James L. Blakeslee, fourth assistant postmaster general, in an address before the Motor Transportation Conference in New York. He said that the War Department was already considering a plan for nation wide use of motor trucks.

Mr. Blakeslee declared that if the motor truck ever does become the chief means of transportation in this country it would be immediately necessary for the government to supervise the construction of roads. He suggested that returning soldiers might be utilized as national road builders before finally being discharged from the service.



Tall doings marked the opening of the Downtown-Grenville jitney line in Jersey City recently. There was a band concert and speeches were made by leading citizens and representatives from lower Jersey City, Lafayette and Greenville. The ceremonies were opened in the assembly chamber of the City Hall, where Mayor Hague extended greetings. The police band played. Later the celebrators went to Exchange Place, where the first motor bus on the new jitney line was started with the city commission and other citizens on board.



Reciprocity privileges extended by New Jersey to commercial vehicles licensed in Maryland have been suspended as a result of the refusal of the Maryland authorities to grant such privileges to commercial vehicles of New Jersey. The action follows a controversy which has been going on for some time. In requiring all New Jersey commercial vehicles to take out licenses to operate in Maryland, the Maryland Department of Motor Vehicles stated that this course was taken because of the pressing need of revenue for the construction of highways.



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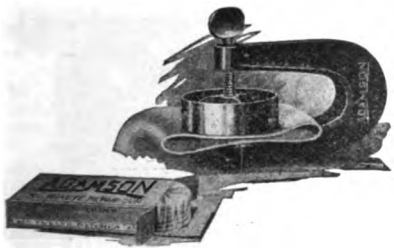
Ford Motor Repair Stand. This repair stand is made primarily for use while overhauling Ford engines, but if desired can be adapted to hold other makes of engines. The engine holding post is telescopic, readily adjusted to convenient working height. The two shelves are made of steel, measuring 30 by 20 inches, and



are welded to steel posts. Malleable iron casters are fitted to the posts, making it easy to roll the table to any position in the shop. Aside from offering a place for putting parts of the engine, the stand is convenient, as the engine may be carried to different parts of the machine shop for machine repairs.

Manufactured by the G. H. Dyer Co., Cambridge, Mass. Price quoted at request.

Five Minute Vulcanizer. Tire trouble is today the motorists' greatest trial. Mechanical troubles often can be foreseen and are dependent upon materials and car usage, while tire troubles are dependent upon conditions which do not follow given laws. The traveling motorist can only guard against these difficulties by preparing himself with suitable repair outfits. For repairing punctures or small holes in tires the Adamson Five-Minute Vulcanizer,



model E, should form a desirable device. This article is designed so that it may be clamped on to the tube, over which has been placed a specially prepared patch. Gasoline is placed in the vulcanizing cup and ignited. The time required for a completed patch is approximately five minutes, and it is said that the resulting repair is extremely efficient. With the vulcanizer is one dozen patches.

Manufactured by Adamson Manufacturing Co., East Palestine, O. Price, $1. Extra patches, 25 cents a dozen.

"E-Z" Welding Compound is a substitute for borax and its use effects an economy of time and expense. It enables an operator to make perfect welds on all kinds of work with one heat. It works easily and well on all kinds of steel and



contains no borax, which accounts for the fact that it does not boil up and roll off the work, but on the contrary, sticks to the metal at low heat. Claim is made that it welds at 250 degrees lower heat than any other compound.

Manufactured by the Anti Borax Co., Fort Wayne, Ind. Price quoted at request.

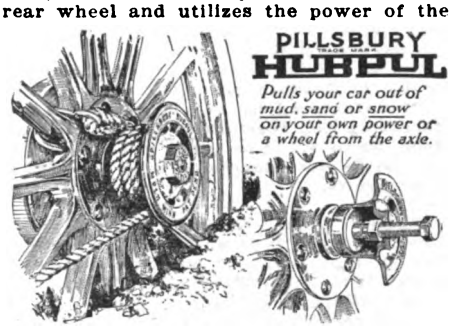
Raybestos Suits. In order to further a national advertising campaign the Raybestos company of Bridgeport, Conn., are offering an extremely interesting proposi-



tion both to trade interests and automobilists in general. One-piece suits which are guaranteed by the manufacturer to prevent all oil, dirt or grease from soiling the clothes of the wearer are being furnished at cost prices by this concern. These suits are well made of heavy fabric in a choice of three weights at different prices, and have Raybestos advertising name printed across them. For the garageman who sells this product it affords good advertising; for the machine owner, such advertising matter is not objectionable, as he is able to get a good suit at an extremely low price.

For further details and prices write to the Raybestos Co., Bridgeport, Conn. Price quoted at request.

Pillsbury Hubpul. Uncertainty as to road conditions will encourage the average car or truck owner to provide himself with a means of extricating his machine should it get stuck. A device which is designed for such a purpose is known as the Pillsbury Hubpul, which consists of a combination hub cap, wheel puller and drum or device for pulling the car from mud, etc. It is easily attached to each rear wheel and utilizes the power of the

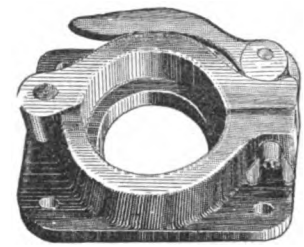


automobile engine for effecting a dislodgment. A rope or cable is fastened to one of the wheel spokes, while the other end is anchored to a stake, pole, tree or other stationary object. When the engine is started the slipping wheels wind the cable over the drum and the car is gradually pulled forward. The strain on the engine is said to be very slight, on account of the large leverage obtained by the reduction through the reels or drums.

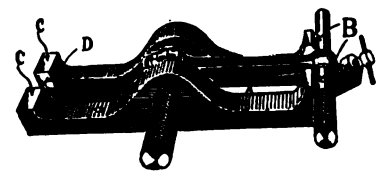
The device is finished in nickel or japanned and is made exclusively for Ford and model 490 Chevrolet cars.

Manufactured by Pillsbury Manufacturing Co., Minneapolis, Minn. Prices, $4 japanned and $6 nickeled.

The Storm Connecting Rod Bearing Reamer, Jog and Straightening Gauge is a new addition to the garage man's equipment. It is especially important and valuable because of the speed with which it does its work and because of the fact that it enables an inexperienced person to do connecting rod work just as accurately as



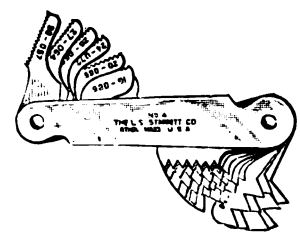
though he had years of experience. The old method of fitting worn connecting rod bearings required considerable time because of the various operations of filing, trying, scraping and so forth; and then, even when done by experienced help could only be approximately accurate. But the results of this tool are mechanically accurate and the work is done in one-tenth the time taken by the old way. In fitting the bearings the faces of the bearing caps are filed away in the usual manner, care being taken to file away a little more than is necessary to take up the wear. The connecting rod is then placed in the



jig, the reamer inserted and the bearing bolts drawn down tight; the reamer is next given one turn and it produces a perfectly round bearing, true and accurate. The tool also tests the rods for bend or twist. An engine should never be assembled without testing the rods in this way. The Ford connecting rod frequently becomes bent or twisted when held in the ordinary vise while tightening the wrist pin bolts and from other causes. To reassemble them in the engine without testing is to invite trouble. Only a moment's time is needed for testing and it is time well spent. The rod is tested for straightness over recess D and for twist and alignment over testing surface BB and CC.

Manufactured by the Storm Manufacturing Co., Thompson, Ia. Price quoted at request.

Screw Pitch Gage. There is no convenience that is more helpful to the repair man than a screw pitch gage with which the pitch of a thread may be determined. The gage illustrated, No. 4, has 24 pitches, ranging from four to 30, and the blades are cut narrow, permitting them to be inserted in small nuts, so that both internal and external threads may be measured. Each blade is marked with the number of threads per inch, as well as a



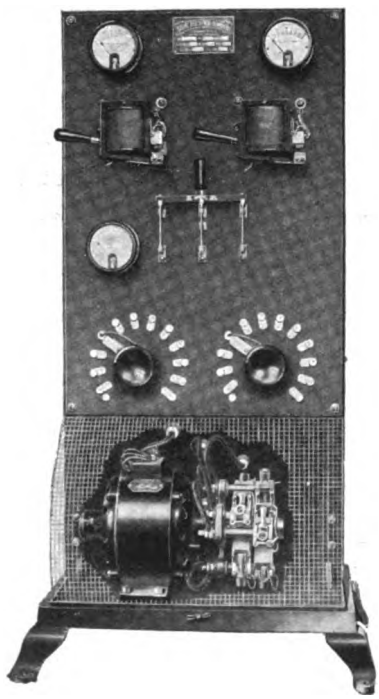
decimal from which the drill diameter may be determined for drilling for either V or flat threads. It is also a convenient tool to use as a 60 degree center gage and as a gage to test the grinding of either an inside or outside threading tool.

Manufactured by the L. S. Starrett Co., Athol, Mass. Price, $1.25.

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Stahl Rectifier. This rectifier changes alternating current to direct current for battery charging by means of a revolving commutator—the simplest and most reliable method yet devised. It is nothing like a motor generator, and on the largest types turns 90 per cent. of the alternating current into direct current, as against the motor generator's 50 per cent. to 55 per cent. A small synchronous motor of one-eighth to one-quarter horsepower serves to turn the commutator. The current which is being rectified for charging the batteries does not pass through the motor. It is reduced by a transformer to approximately the voltage required for charging, then passes to the commutator, being collected from the commutator as direct current by brushes.

Voltage reduction is, therefore, brought about principally in the transformer, making unnecessary wasteful resistance in the battery circuit. The direct current delivered is pulsating, the heating effect of which is less than with straight direct current. Therefore, charging can be done



at a higher rate and in less time. It is a very rugged, compact machine; there is nothing delicate about it. It comes complete, with switchboard and all necessary instruments in place. All there is to do is to connect the two power leads, attach the battery leads and you are ready to charge. There is no extra equipment or accessories to buy.

Anyone can connect it up, start it and stop it. It requires very little care, aside from keeping it well oiled and the commutator clean, as in the case of an ordinary motor. There are four models of the Stahl rectifier for battery charging, models S and SX have three direct current charging circuits. The model N (illustrated) has two circuits and the model M one circuit. Rectifiers in any of these models are furnished to operate on 110 volt or 220 volt power circuits. The voltage must be specified, however, in ordering, as the machines do not operate interchangeably on 110 and 220 volts.

Manufactured by Stahl Rectifier Co., 1401-1405 West Jackson Boulevard, Chicago, Ill. Price, model N, double circuit, $220 complete. Write for literature and prices of other models.

White Stripe Transmission Lining for Ford cars. A treatment has been produced by the Advance chemists which resists and neutralizes the action of hot oil on cotton fiber. A mechanical method of applying this treatment to the woven fabric also has been devised by the manufac-



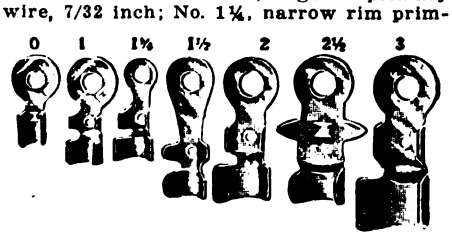
turing department of the Advance Corporation. This successfully introduces the chemical formula into the cotton fabric and so thoroughly saturates every fiber that Advance White Stripe Lining retains its heat and oil resisting qualities for a remarkably long time.

The White Stripe process does not harden the fiber of the cotton lining. On the contrary, it keeps it soft and pliable, so that it has ideal braking surface against the drum of the car throughout its life.

The White Stripe product is sold ready boxed in sets of three or in rolls. Every foot or strip is marked with the white stripe.

Manufactured by Advance Automobile Accessories Corporation, 56 E. Randolph St., Chicago, Ill. Prices: In boxes, $2 per set of 3; Rockies west, $2.25; Canada, $3. In rolls, 32 cents per foot; Rockies west, 35 cents; Canada, 40 cents.

Copper Terminals (standard "Lug" type). These are made of copper of proper thickness to work well. They are of high grade material and the best workmanship. No. 0 is a small primary wire, 5/32 inch. The others are: No. 1, regular primary wire, 7/32 inch; No. 1¼, narrow rim prim-



ary wire, 7/32 inch; No. 1½, long neck primary wire, ¼ inch; No. 2, regular magneto, 5/16 inch; No. 2½, large magneto, ⅜ inch; No. 3, large secondary, ½ inch.

Manufactured by the Fitzgerald Manufacturing Co., Torrington, Conn. Price per 1000, $2 to $7. For price and delivery of any style not illustrated send samples or blue prints.

Shaler Home Garage Model handles every kind of tube and casing work that the average motorist will care to undertake. It is splendid for use at home where practically all repairing is done. Dealers should recommend it as a vulcanizer for use where electric current is accessible.

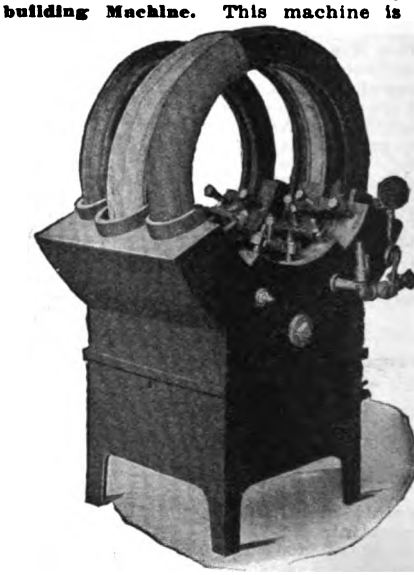
Tube and casing surfaces are 2½x7 inches



—twice the size of any other motorist's vulcanizer. Electricity is the safest heat for vulcanizing when temperature is regulated automatically as in this vulcanizer, and conflicts with no garage regulations. Thermostatic heat control maintains the exact vulcanizing temperature so that a tire cannot be overheated, and by maintaining this temperature as long as necessary, permits curing through the thickest tread as well as making superficial repairs. Upon connecting the vulcanizer to any lamp socket the temperature quickly rises to the required degree and remains there as long as the current is turned on. No regulating is required. All parts of the repair are heated alike. When several repairs are to be made in succession the hot vulcanizer can be moved from one to the other by the cool handle. One or two tubes can be mended at a time. Outfit includes tube shelf, 10 foot conducting cord, thermometer, repair material and illustrated instructions. Current consumption 70 watts. Weight, 13 pounds.

Manufactured by C. A. Shaler Co., Waupun, Wis. Price, type D, No. 83, polished nickel, for D. C. or A. C., $12.50. When ordering, specify voltage of your city current.

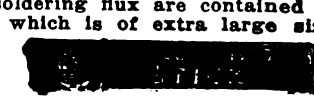
Zwebell Ribbed Retreader and Tire Rebuilding Machine. This machine is de-



signed to meet the demand for a moderate priced equipment, to provide a shop with a means of rebuilding a tire in sections or complete. The machine is of the en bloc type, having three one-third circle cavities with cross sections of 3½, 4¼ and 5¼ inches respectively, and will handle any size tire from 28 by 3 to 38 by 5½. The cavities are deep enough to cure the tire over the beads when desired. The boiler is self-contained, using gas or kerosene as fuel to generate steam. The ends of the cavities are provided with semi-curing flanges, to guard against any breaks in the cure.

Manufactured by Zwebell Brothers Co., 482 Milwaukee St., Milwaukee, Wis. Price, machine complete with equipment, $550.

Norwesco Soldering Stick goes much farther than soldering salts, as all waste is eliminated. Materials necessary to a perfect soldering flux are contained in this stick, which is of extra large size. No



acids or other materials are used in the manufacture that will injure insulation or electrical work. It is economical because of the small amount necessary to prepare the joint. The stick is firm and will not crush or break easily. The stick holds its form, making it easy to handle. It is wrapped in wax paper.

Manufactured by the Northwestern Chemical Co., Marietta, O. Price, sticks, 1x5½ inches, 25 cents.

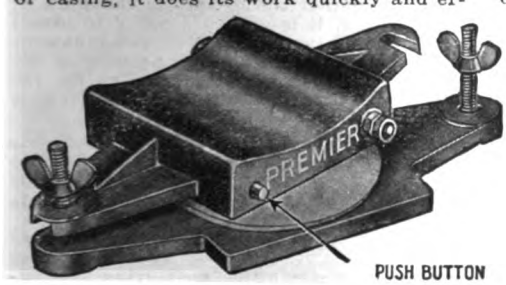
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Miller's "Economy" Kettle Vulcanizer requires a very small amount of steam on account of its "doughnut" construction. It will repair from a 2½x28 inch to a 5x37 inch, inclusive, casing, having a capacity, which is governed by the size tires being repaired, of from two to four tires in one heat. It is made of cast iron and provided with a hinged lid and counter balanced weight to assist in raising the heavy lid. This counter balance can be adjusted so that the lid may be opened or closed with one hand, and when this lid is raised and is past the center of gravitation it stays open.

Manufactured by Charles E. Miller, Anderson, Ind. Price, furnished complete as large kettle, shipping weight approximately 800 pounds, $125. Vulcanizer may be equipped with gas burner, if preferred, at an extra cost.

The Premier Automatic Electric Vulcanizer is of the portable type and while it occupies but a small space, together with the complete outfit for repairing practically any size injury to either tube or casing, it does its work quickly and efficiently. It does not do temporary work, but permanently fixes the cut and is absolutely automatic in operation, the heat being provided by electricity through connections with either the battery or lighting circuit. Premier Vulcanizers are furnished to operate either from 110-volt lighting circuits or storage batteries. The standard voltages of the latter type are 6, 12, 18 and 30 volts, and when operated direct off the storage battery on the car are positively guaranteed not to damage the battery or interfere with its efficiency for starting, lighting or ignition. The 110 volt type will operate from both alternating and direct current. In ordering the voltage to be used should be specified. Immediate deliveries can be obtained.



Manufactured by the Premier Electric Co., 4032-4042 Ravenswood Ave., Chicago, Ill. Price for complete outfit, $3.50.

The Continental Creeper has big double wheel casters, heavy welded frame, rolls easy and will not break. The slats are steel bands and it is big and roomy and has a well padded head rest. Experience teaches that where cheap creepers are used an average of over an hour a week will be spent in their repair and this time, at the present high cost of labor, will pay for three Continental Creepers in a course of a year. The Continental is convenient.

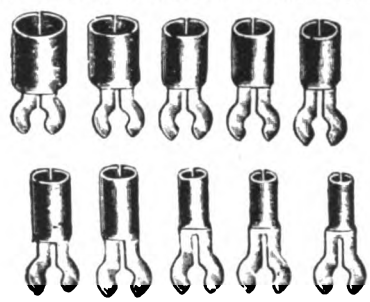
A slight push changes the position. The large double wheel casters will not stick and bind in rough places in the floor. It is not necessary to lift yourself entirely off the creeper every time you change your position, because that caster is broken again. No waste energy, no aggravation, solid comfort and utility. The strips of metal conform to the shape of



the body and the head rest is covered with oil proof cloth and can be readily cleaned or removed. It is big and roomy, 20 inches by 44 inches, and built for service.

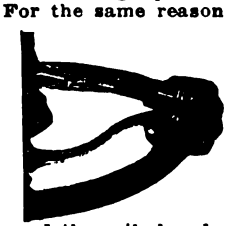
Manufactured by the Continental Auto Parts Co., Knightstown, Ind. Write for literature and prices.

Slip Snap Terminals are serviceable in practically all places, but particularly so on spark plug nuts, etc. These clip terminals enable you to disconnect the wires from the spark plug instantly and are a great help for the autoist. They are made in sizes to fit all standard cables.



Manufactured by the Fitzgerald Manufacturing Co., Torrington, Conn. Price per dozen, 50 cents; per 100, $3; per 1000, $20.

The Apco Watershed for Fords prevents water dripping on the coil and spark plug wires and filling up the spark plug recesses. For the same reason the car is



apt to skip and the coils break down. This device absolutely protects all the wires in the most heavy rainstorm and subjects the engine to instant starting in wet weather.

Manufactured by the Apco Mfg. Co., Providence, R. I. Price, $1.



Mills Patch. This is the supreme self-vulcanizing patch for auto tires, motorcycle tires, rubber boots, hot water bottles or anything rubber will patch. Mills Patch meets the requirements of all climatic conditions. Its sticking qualities are not affected by heat or cold. Mills Patch self-vulcanizing outfit consists of a sheet of pure para rubber, a tube of rubber cement and a buffer.

Auto Parts Co., 4103 Olive St., St. Louis, Mo. Price $1. If your dealer cannot supply you the Auto Parts Co. will send same postpaid on receipt of price.

Shaler 5-Minute Patch and Heat Units. The average user buys several packages each season, as they are used not only on tires, but on other rubber articles. Few

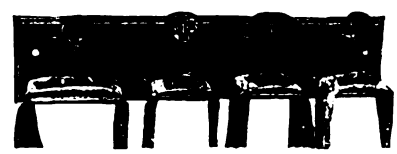


accessories produce such a continuous resale. They are packed 12 of a size in air tight boxes.

Manufactured by C. A. Shaler Co., Waupun, Wis. Prices, round patch and heat units, 1¾ inches diameter, per box of 12, 75 cents; oblong patch and heat units, 2¼x1⅜ inches, per box of 12, 75 cents.

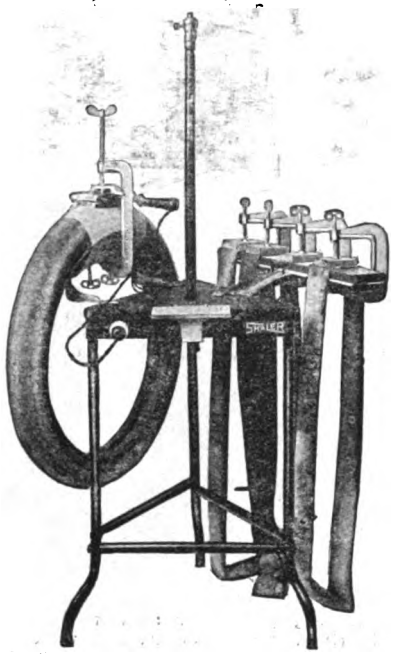
Shaler 5-Minute Garage Vulcanizer. This new Shaler vulcanizer meets the demand for an outfit to use the convenient Shaler patch and heat units in a commercial way. It uses the standard sizes of Shaler patches and in addition mends much larger cuts with the new four-inch ex-long patches. Makes four repairs at one time in five minutes. It hangs on the wall, taking little room.

The Shaler patch and heat unit is always ready for instant use day or night. It is a complete unit—a compact combination of chemical fuel, vulcanizing pan and raw rubber patch. Simply clamp it over the puncture, light the non-flaming fuel and in five minutes you have a permanent, feather edged repair as strong as the tube itself. Included free is an assortment of patches.



Manufactured by C. A. Shaler Co., Waupun, Wis. Price, type M, No. 4, $10.

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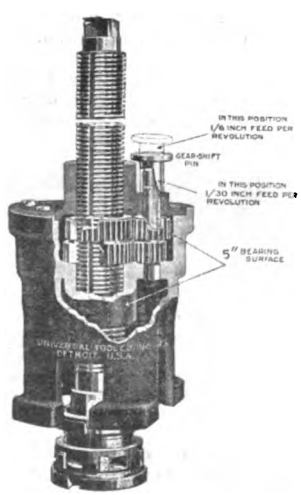


Shaler Electric Garage. Plant. This plant, type Ace, consists of the complete units type A, type C and type E, mounted on a strong tubular stand. It will do the same perfect work and has the same capacity as type NPR steam plant—20 tubes and one casing per hour. The temperature is controlled automatically.

Types C (inside casing form) and E (tube plate) are permanently attached to the stand and have separate switches to permit independent heating. Type A (outside casing form) has five feet of conducting cord, ending in a plug, which fits a socket in the stand or any lamp socket if work is to be done elsewhere on inflated tires. All electrical wiring is complete in the stand and connection to city current is made overhead, out of the way, through a plug at the top of the upright standard by means of extension cord to any lamp socket. No special wiring is needed, as the entire apparatus consumes less current than an electric flatiron. Shipping weight, 115 pounds.

Manufactured by C. A. Shaler Co., Waupun, Wis. Price: Type Ace, No. 101, for A. C., $65; for rheostat controlled direct current equipment add $10 to list price. (Specify voltage when ordering.)

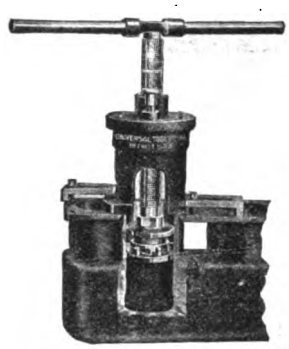
The Universal Cylinder Reboring Tool. This tool has been adopted by some of the largest and best automobile manufacturers for boring cylinders, replacing in their plants and service stations higher priced equipment, usually of the grinder type. The tool can be operated by any ordinary workman. All that is necessary



is to have the shop foreman determine the exact size of the new piston by micrometer and then set the tool to the size required.

All six cutting tools are adjusted by one turn of the adjusting pin. A very important feature is the gear shift, or two speeds. A 30-inch thread is used in boring, which gives a fine feed and smooth cut. When the bore is finished by a touch on the gear shift pin the tool can be backed out at the rate of six revolutions per inch. This speeds the removal of the tool from the cylinder.

The Universal Tool Co. has been granted patents on the square threaded feed screw, which is carried in a rigid five-inch bearing surface. It is possible to use the cylinder reboring tool on any open or closed



end cylinder. The tool is very substantially made and comes packed in a substantial hard wood chest.

Manufactured by the Universal Tool Co., Detroit, Mich. Write for literature and prices.

Tire Talc and Tire Mica are both Norwesco products. You can make the task of putting in an inner tube much easier by carrying in your tool box a can of Tire Talc. Just shake a little out of the sifter top into the casing and you can easily get the inner tube in place.

The life of your inner tubes will be greatly lengthened by the use of Norwes-



co Tire Mica. It is a fine powder ground from the best American mica, and is a sure protection against the inner tube sticking to the casing, the result of heat caused by friction. It never cakes and cannot injure the rubber.

Manufactured by the Northwestern Chemical Co., Marietta, O. Price, Tire Talc or Tire Mica, 2x6 inch tubes, 10 cents.

Sterling Battery Meters are for testing electrically all kinds of dry cells or storage batteries. The pocket meters are made in two different sizes, one for ordinary pocket use and the other, smaller and more delicate in appearance, for vest pocket use. The ammeter is for testing dry cells. Many persons do not carry pocket meters because they do not realize the many uses to which they may be put. Every repair man knows, however, and he generally has several in his chop.

A storage battery without a voltmeter is likely to prove an exceedingly expensive and uncertain article. Contrary to popular opinion, a voltmeter, applied while the battery is furnishing current for the engine or lights, gives just as reliable an indication of the current strength and condition of the battery as a large, expensive dashboard ammeter.



The voltmeter is a combination of the ammeter and voltmeter in a single case. It is invaluable to those who work with both dry and storage batteries.

The Sterling Dash Meters are for dashboards, charging outfits and small switchboards.

A car equipped with electric lights or a starting system should have a charge and discharge ammeter to show the amount of current consumed and the rate of charge if the system is equipped with a generator. If the car is equipped with an



indicator, an instrument which indicates merely whether the battery is charging or discharging, it is only necessary to insert an ammeter in the place of the indicator and connect up the binding posts with the same wires that were attached to the indicator to know at all times the exact rate of charge and discharge.

A dash or a switchboard voltmeter is also very convenient as it enables one to know the condition of his battery at all times without uncovering the storage battery to use a pocket voltmeter.

All of these instruments are of the permanent magnet type and, like the pocket meters, are scientific measuring instruments of accuracy and reliability. They are very rugged, which especially adapts

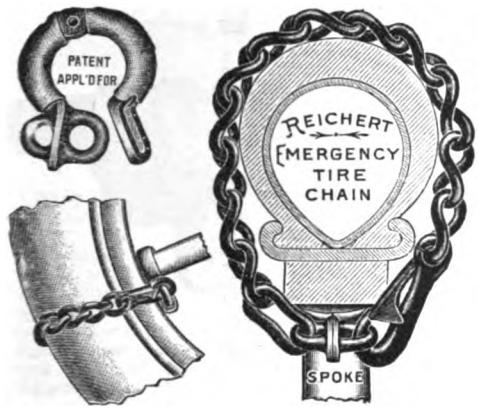


them to dashboard use. Particular attention is paid to the bearings and the adjustment of the light moving element. These instruments are made in two patterns. Both types are handsome, accurate and durable.

Manufactured by the Sterling Mfg. Co., 821 Frankfort Ave., Cleveland, O. Write for literature and prices.

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Reichert Emergency Tire Chain. Reichert's chains are single chains fastened to the spoke with malleable clamps. The clamps are made of best grade malleable iron; the chains are of twist link pattern, extra heavy with a strong, substantial snap that locks the clamps. With a set of these chains on your auto you can pull out of the deepest mud or snow The chain can be put on in a moment. Put the clamp around the spoke, pass the chain around the tire and fasten snap in open



eye of clamp. The device is so simple a child can operate it. They are packed a set of four in a bag, enough to pull you out of any mud or snow. No. 1 fits 3 and 3½ inch tires, set of 4, $3.20; No. 2 fits 4 and 4½ inch tires, set of 4, $4.00; No. 3 fits 5 and 5½ inch tires, set of 4, $5.00.

Manufactured by Imperial Bit and Snap Co., Racine, Wis.

Advance Cork Insert Transmission for Fords. This equipment affords smooth action, sure braking and long wear. When the brake is engaged the corks touch the brake drums first. They compress gradually and ease the load down to the fabric. The light pressure required and smooth

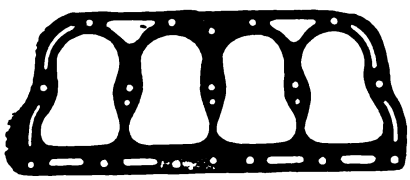


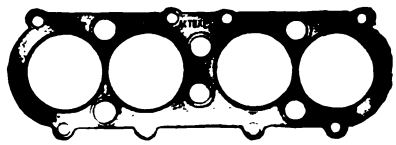
action of the buttons of cork coming into contact with the drums mean long wear. The secret of cork insert service and its success is the cork insert way of combining cork and lining.

Manufactured by the Advance Automobile Accessories Corporation, 56 E. Randolph St., Chicago, Ill. Price, $3 per set of 3.

Never-Leak Cylinder Head Gaskets. There is a very large demand for cylinder head gaskets and the Fitzgerald Manufacturing Co. is prepared to make immediate shipment of gaskets from stock.

Among the gaskets carried in stock are the Briscoe 1916 model, Buick 1914 model, Buick model 4-36 1917, Cadillac 8, Chevro-





let, Chalmers, Crow-Elkhart, Dodge, Dort, Enger, Grant 1916 model, Hupmobile 1914 model, Hudson Super-Six, Interstate, Kissel Six, Kissel Twin-Six, Maxwell, Monroe, Mitchell-Lewis, Metz, National, Oldsmobile 1914 model, Oldsmobile 1917 model, Overland model 75, Overland model 83, Overland model 90, Oakland Six, Oakland Four, Packard Twin Six, Paige model 38 1916, Paige model 46, 1916, Pathfinder, Pullman, Republic, Saxon Four, Saxon Six, Scripps-Booth 1917 model, Scripps-Booth 1915 model, Velie and Vim.

New gaskets are being made continually, and the company may be able to supply you with any not on its published lists.

Manufactured by the Fitzgerald Mfg. Co., Torrington, Conn. Write for literature and prices.

Simplex Auto and Truck Jacks are noted for wonderful safety features, strength, ease of operation, durability, convenience and guaranteed reliability. The No. 36 Simplex has been especially designed for light cars. The No. 38 is for heavier construction, especially for use with medium weight pleasure cars, and is fitted with an



adjustable shoe which locks at seven different heights.

No. 41 is the most popular model, and has a rated capacity for 2000 pounds, but will easily lift 5000 pounds. Every part with the exception of the frame or standard is a steel drop forging. The short stroke insures easy lifting. There are three points of lift—cap, lower foot and steel auxiliary removable shoe, the shoe being an exclusive Simplex feature, a wonderfully convenient attachment when the car is in a bad rut. The cap rotates, permitting use of shoe in any operation. Nos. 42, 43 and 44 are built expressly for heavy trucks or limousines.



No. 45 will appeal to the owner of the luxurious limousine who is seeking the highest class and most efficient accessories for his car. No. 47 has been designed for trucks up to 7½ tons capacity and over.

Manufactured and guaranteed by Templeton, Kenly & Co., Ltd., 1020 S. Central Ave., Chicago, Ill. Prices, $2 to $20, subject to advance.

Clero Junior is a new model horn brought out by the Fitzgerald Manufacturing Co., the manufacture of both the old types of vibrator horns known as the Clero and Clero, Jr., having been discontinued. This horn has the same working mechanism, except for minor improvements, and is exactly the same as the old type horns except for the bell, which is somewhat shorter than on the old type Clero, is oblong in shape at the opening, and in other ways is a great improvement



on the bells of the old types of both the Clero and Clero, Jr., horns.

Clero, Jr., is made with standard finishes, all black, black and brass or black and nickel. The length over all is 11 inches. It weighs unpacked 2½ pounds. It operates on four or six dry cell batteries or a storage battery. Complete wiring and attractive metal push button are furnished with each horn.

Manufactured by the Fitzgerald Mfg. Co., Torrington, Conn. Price, $4. Write for literature and prices of other Clero horns.

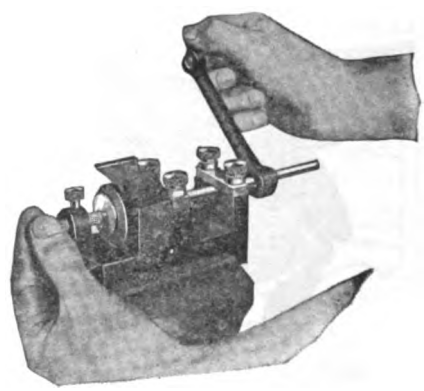
Two-Point Hard Rubber Switches for coils, batteries and magnetos. These are made with high grade rubber base and brass lever and contact button, nickel plated. The lever can be removed to prevent tampering when not in use. These may be used in connection with Ford elec-



tric lighting outfits or in any other case where a small, serviceable hard rubber switch can be utilized to advantage.

Manufactured by the Fitzgerald Mfg. Co., Torrington, Conn. Price, 25 cents each; in quantities of 100, 19 cents each; in quantities of 1000, 16 cents each.

Sioux Ford Valve Refacing Tool. Although low in price, this is a high grade

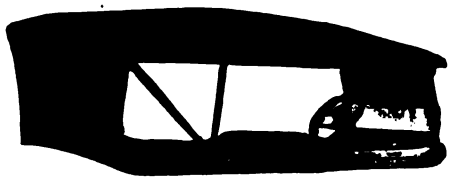


tool, accurately made. It will face Ford valves accurately and smoothly. The cutter is made of high speed tungsten steel, the same as used for lathe tools.

Manufactured by Albertson & Co., Sioux City, Ia. Price, $1.50.

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Gordon Seat Covers are made of specially woven fabrics. All edges are bound with artificial leather and arm rests are covered with it. Extra strong glove snap fasteners are used to make attaching the covers quick and easy. Gordon three-piece seat covers with the "Sectional Overlap Lazy-back" please with their attractiveness and add to the riding comfort.



The overlapped corners yield to every movement of the upholstery. When you lean back they give so you can enjoy the comfortable cushions. The overlap relieves all strain on fabric and fastenings because its flexibility permits each section of the covers to conform to the movement of the upholstery without strain on any part. It yields as you lean back and when you get up it is carried back to place by the upholstery. If a spot is damaged by some unusual wear or a bad stain, your whole set of covers is not ruined, only the damaged section needing to be replaced.

Manufactured by the J. P. Gordon Co., 366 N. Fourth St., Columbus, O. Write for literature and prices.

Never-Burn Engine Enamel. When your engine gets marred, scratched and rusty, a coating of Never-Burn will make it neat and attractive again. Never-Burn is applied with a brush and needs no filler. The heat of the engine bakes the enamel and it adheres like a part of the engine itself. It will not crack, chip or scale. It comes in two finishes, gloss black and battleship gray.



Manufactured by the Northwestern Chemical Co., Marietta, O. Price, half pint cans, 50 cents; pint cans, 85 cents.

The Gasograph Dashboard Fuel Indicator is a tell-tale device that indicates within a safe distance the quantity of gasoline in the tank. It has a measuring scale of from "full," three-quarters, one-half, one-quarter and "empty." It is mounted upon the dash in plain view of the driver and is connected to the rear or front tank by copper tubing, the pressure of the weight of the gasoline being transmitted through the tubing to the instrument on the dash. It works automatically, for it has no floats or wires and requires no attention once installed. The unevenness of road conditions has no effect upon the instrument and temperature variations are automatically compensated. The tubing has a connection that is screwed into the drain opening of the tank and it is easily installed, requiring no drilling of holes.

Manufactured by the New Standard Adding Machine Co., St. Louis, Mo. Gasograph for rear tank, $7; for front tank, $6.

Columbia Storage Battery. The point of particular importance to the accessory and garage trade regarding the Columbia storage battery is that this battery is sold directly through the jobbing trade to the dealer. In working out the details of the sales plan the National Carbon Co., Inc., has made it possible for every dealer to get his share of the storage battery business. What is more, it is not necessary according to the Columbia plan to carry an immense stock of batteries and parts with a large amount of capital involved and provide a complicated expensive repair service department in order to sell



Columbias. The central distributing service stations carry complete stocks of Columbias and make it possible for the dealer to draw on these service stations for their supplies.

The good faith in Columbia prompted the National Carbon Co., Inc., to back its product with a real guarantee. This guarantee is not a mere "adjustment affair" covering workmanship and material, but a guarantee actually insuring the life of the battery. This broad, definite guarantee is made possible largely because of the many improvements embodied in the Columbia. It includes such features as the honeycomb grid, the universal terminal, the inclined plate feet, the acid proof battery case and many others.

Manufactured by the National Carbon Co., Inc., Cleveland, O. Write for literature and prices.

Black & Decker Drill. The Black & Decker Manufacturing Co., Baltimore, Md., maker of B. & D. Portable Electric Drills, "With the pistol grip and trigger switch," has added a new sze drill to its line on which it is now making deliveries. This drill has a capacity of ⅜ of an inch in steel and weighs only 27 pounds and is equipped with a removable No. 2 Morse Taper Socket to take taper shank drills up to ⅜ inch in diameter.



The drill measures 5¾ inches by 17 inches long and has an offset spindle 2¾ inches from the center of the spindle to the edge of the frame. This drill is also equipped with a light weight, high powered, series compensated motor which delivers a maximum output of more than one-half horsepower. Its light weight and the automatic control provided by the "pistol grip and trigger switch" makes this drill highly adaptable to a wide variety of work.

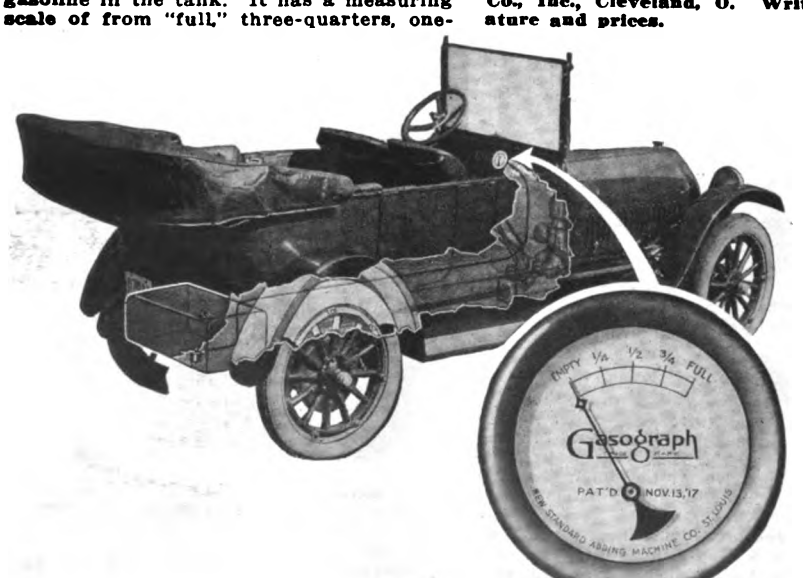
Made by the Black & Decker Mfg. Co., Baltimore, Md. Prices quoted on request.

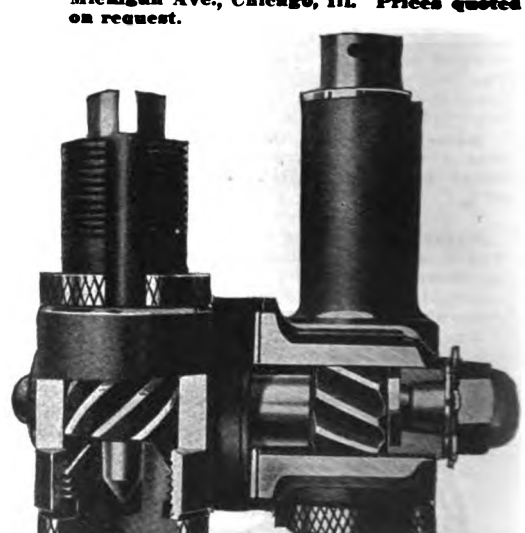
F. W. S. Swivel Joint. F. W. Stewart, manufacturer of a number of accessories, is a firm believer in the F. W. S. Swivel Joint for speedometer drives and is putting out a novel idea for the jobbers' salesmen to demonstrate the quality of that swivel joint by showing the "inside of the works."

The swivel joint furnished has sections cut out, as shown in the illustration, displaying the various points of superiority so that they may be readily understood by those not entirely familiar with the structural details of such devices.

They are sent out to jobbers for the use of their salesmen when calling on their trade. Owing to the considerable expense in producing these cut out swivel joints, they are not being sent broadcast, but any recognized jobber may secure a number sufficient for his salesmen.

Manufactured by F. W. Stewart, 1404 S. Michigan Ave., Chicago, Ill. Prices quoted on request.





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The Continental Battery Stand. Storage batteries are very heavy and in their repair it is necessary to constantly change their position in order to more readily get at the various parts. This takes a great deal of effort and besides considerable time is wasted, and the time of your skilled mechanics is very valuable.

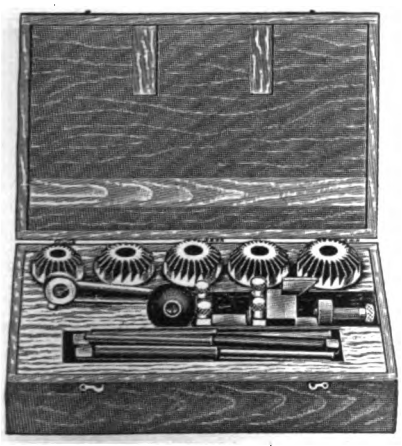


You will find the Continental battery stand to be of great assistance. Every battery bench needs several of these stands to help speed up the work, and the greater per cent. of the back-breaking lifting will be eliminated. It will encourage your mechanics to turn out better and cleaner work. This stand makes an excellent arrangement for displaying batteries on your counter, or in your show window. In fact you will find many uses for this stand other than battery repair work.

The Continental battery stand turns very easy, since it is on ball bearings and can readily be locked in any position. The top is made of one piece of hard wood 1½x7x10 inches, which eliminates the danger of short circuit, and will not be affected by acids. Handsomely finished in natural wood color and black enamel. Comes complete with screws for attaching to work bench. Shipping weight, 12 pounds.

Manufactured by the Continental Auto Parts Co., Knightstown, Ind. Write for prices and literature.

Sioux Valve Tool Set. Sioux valve seat reamers reface valve seats with the same dispatch, accuracy, smoothness and general satisfaction that the Sioux refacing tool turns the valves. The Sioux valve tool set is complete enough to take care of practically all the jobs that an average garage or auto repair shop is likely to get. It includes five reamers, 1⅝, 1⅞, 2, 2⅛ and 2¼ inches. 45 degrees (30 and 60 degrees can be had on request), three pilot stems,



5/16, ⅜ and 7/16 inches. The valve seat cutter is made on the reamer principle and is guaranteed to work with absolute accuracy and smoothness. The pilot stems are finished to accurate size, insuring perfect dimensions and accuracy.

The reamer heads are furnished in three angles, 30, 45 and 60 degrees and any sizes to fit the valve from 1⅛ inches to four inches in diameter. Pilot stems are provided in all sizes.

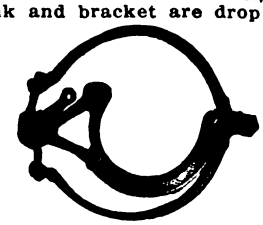
Manufactured by Albertson & Co., Sioux City, Ia. Price, $22.50.



Hold-On Patch. This is a Blue Ribbon product for tubes, tires and all rubber repairing. It is an elastic rubber patch, manufactured from the finest grade of rubber, and is prepared especially for patching purposes without the use of heat, which increases the strength of the tube at puncture point without loss of resiliency. Hold-On Patch can be applied easily and quickly at any time where trouble occurs. It is invaluable for blowouts in tubes and casings, owing to its self-vulcanizing qualities.

Manufactured by the International Metal Polish Co., Inc., Indianapolis, Ind. Prices, 25 cents, 50 cents, $1 and $1.50.

Holdford Brakes are high grade external, contracting brakes for Ford cars, which can be easily and quickly installed by any mechanic with a wrench, to act from the hand lever as emergency brakes, or from the foot pedal as service brakes delivering the braking power direct to the rear wheels at 100 per cent. efficiency and taking all strain from the rear axle, shaft, gears, keys and transmission bearings. The band and brace are of steel, the toggle crank and bracket are drop forgings



and the lining J-M non-burn. Holdford brakes do not drag when released or worn and cannot rattle. No readjustment for wear is necessary, oiling is easy and they will outwear the car.

No changes, alterations or new holes are made when Holdford brakes are put on in place of the regular hand brake, which is removed or not, as desired. Extra pull rods, an equalizing bar and a hole in the foot pedal are the only changes necessary for substituting Holdford brakes in place of the regular transmission brake.

The G. H. Dyer Co., Cambridge, Mass. Hand brake, $10 per set net; foot brake, $15 per set net.

Soldering Paste. Solder will flow on and fuse easily when Norwesco Soldering Paste is used. This is a scientific com-



pound for use on all classes of soldering work. It is more efficient and easier to handle than acid.

Manufactured by the Northwestern Chemical Co., Marietta, O. Price, 2½ ounce cans, 25 cents.

Rain-Sno Clear View Windshield Cloth keeps the entire glass clear by chemical action Rain, snow or sleet must run off because the chemical used in the manufacture of Rain-Sno is antagonistic to water or water vapor. The product con-



tains no grease or oil or anything to soil the hands or smear the glass.

Automobile Sundries Co., 44 Bromfield St., Boston, Mass. List price, $72 per gross; single cloths, 50 cents each.

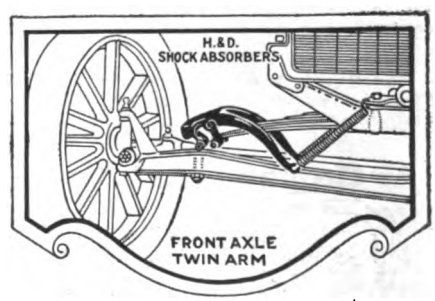
The Ever Last Resole is in fact a complete new tire without beads, and is applied over the old casing. It extends clear down over the beads and when applied to the rim it cannot be distinguished from a new tire. It is not a "sewed on" or "double tread," but is built right on over the old casing, and becomes an integral part of it. It can be successfully attached



by any repair man or vulcanizer. It is made exactly like a new tire of three plys of close woven 21½ ounce long staple cotton fabric. Each ply is treated with a heavy coat of pure rubber and the tread stock is built over this fabric body. Prompt deliveries.

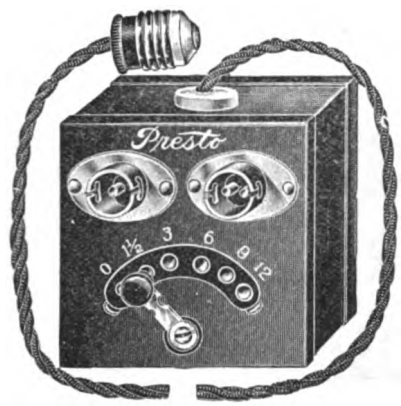
Manufactured by the Ever Last Tread Co., Inc., Indianapolis, Ind. Price quoted at request.

H. & D. Shock Absorbers are constructed in keeping with the principle that the tension is different on the upward and downward thrust, which fact is claimed to make this shock absorber exceptionally efficient. The makers say that these shock absorbers save tires by preventing side sway and pounding. Vibration, which loosens up bolts and screws, is eliminated, as is also rattling. Can take care of 1919 requirements.



Made by the H. & D. Co., Inc., Goodland, Ind. Price per set of four, $10.

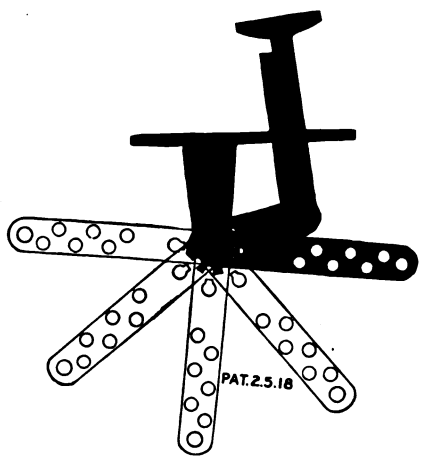
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The Presto Bulb Tester is designed to test all sizes of automobile bulbs that have an Ediswan base and the dealer when selling a bulb can test it before the purchaser's eyes, thus proving that the bulb is perfect and also that it is of the correct size for installation on that particular car. The switch lever at the front has contact points for 1½, 3, 6, 9 and 12 volt bulbs. It can be attached to any ordinary 110 volt socket and is equipped with seven feet of lamp cord. The device is enclosed in a neat metal case of black enamel with trimmings of nickel plate.

Manufactured by the Metal Specialties Manufacturing Co., 338-52 N. Kedzie St., Chicago, Ill. Write for prices.

The Petry Universal Pedal is a pedal designed for muffler cut outs, accelerators, exhaust whistles, heater valves, etc. This

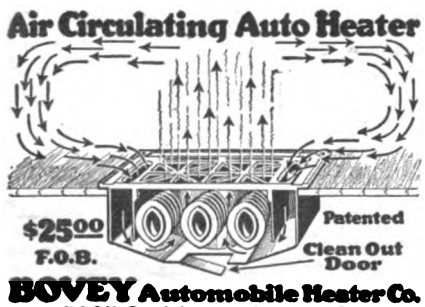


device can be used either to pull or push and is made of high grade steel, gun barrel finish.

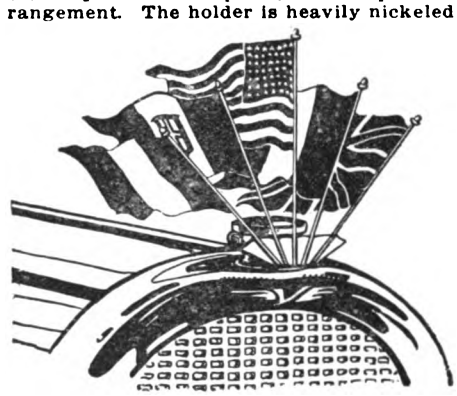
Manufactured by N. A. Petry Co., Inc., 1307 Race St., Philadelphia, Pa. Price, 75 cents.

The Bovey Automobile Heater is of the "flush" type, setting even with the floor and has a coil box 8x18 inches, three inches deep. The coil is insulated by an asbestos lined wall and air space from the woodwork of the car. It is not merely a foot warmer, but radiates a strong current of heat, sufficient to warm the interior of a closed car to any desired temperature. It draws the cold air in the car down through the annular space surrounding the coil and delivers it hot through the center. This constant circulation gives a steady flow of heat as long as the engine is running, without expense for operation. It is so designed that it will not smoke, rattle or burn the shoes of the occupants. The "Flexiform" exhaust valve with which it is connected up fits any size of exhaust pipe. Prepared to make quick deliveries.

Manufactured by the Bovey Automobile Heater Co., 3907 Prairie Ave., Chicago, Ill. Price, $25.



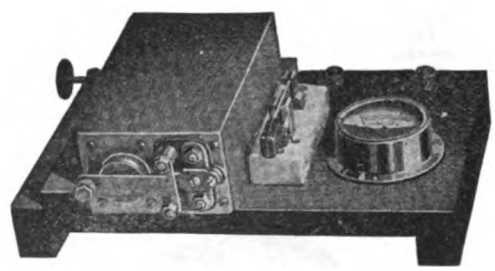
The New Liberty Flag Holder is a cleverly made little device for making possible the attachment of five flags to the radiator cap of an automobile. This device is so designed that the flags are held in front of the filler cap in a fan shaped arrangement. The holder is heavily nickeled



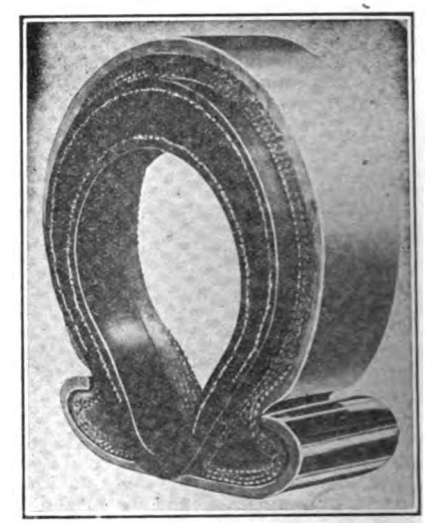
and carries steel flag staffs, which are firmly secured in the holder. A special effort has been made to prevent the fraying of the flags, which are made of special silk and heavily stitched at the edges.

Manufactured by the Stanley Manufacturing Co., Dayton, O. Price quoted at request.

B-W Ford Ignition Coil Tester. To give satisfaction the ignition system of a car must be in perfect working order. The Ford car ignition system and its proper performance is dependent upon four secondary coils. The adjustment of these coils is a delicate matter and "hit or miss" methods cannot be used if satisfactory functioning is desired. The B-W Coil Tester, illustrated herewith, is a device by which the coils may be tested and adjusted. It consists of a wood base upon which is mounted a low reading ammeter, receptacle contact springs in which the coil may be placed, two binding posts for connection with a six-volt storage battery, an adjustable spark gap and primary switch. The coil to be tested is slipped into place, a battery connected, the switch closed and the ammeter reading noted. If the coil is in good condition the ammeter reading should be approximately 1½ amperes, with a continuous flow of sparks across a ¼ inch spark gap. The vibrator points are adjusted or spring bent until such a result is had.



Manufactured by Ballman-Whitten Manufacturing Co., 2867 Gravois Ave., St. Louis, Mo. Price, $5.10.



The Sternwear Puncture Proof Inner Tires were displayed for the first time at the New York Automobile Show and attracted much attention. The maker advises that they are designed to give upwards of 20,000 miles of service without puncture or blowout because of their patented construction, and that they have been subjected to almost every test conceivable before they were placed on the market. A million dollar concern was recently organized to manufacture these tubes.

Made by the Sterns Tire and Tube Co., St. Louis, Mo. Price quoted at request.

Shaler Vulcanizer. The accompanying illustration shows the unique display carton in which the Shaler five-minute vulcanizer is being supplied to dealers. The cover of the stand provides for a real vulcanizer to be fastened to a section of inner tube, showing both the method of



operation and a completed repair. Opposite the vulcanizer is a match, slipped in a little holder. The color scheme and idea are striking and the combination forms an ideal "Silent Salesman" of the Shaler vulcanizer.

Manufactured by C. A. Shaler Co, Waupun, Wis. Price quoted at request.

The Stevens Bearing Scrapers are made from drop forgings, carefully hardened and ground to edge. They are made in convenient shapes and come in sets of three as illustrated, the largest being 13



inches long. This is one of 200 products described in the new Stevens Catalogue 86-A, copies of which are to be sent free to dealers.

Manufactured by Stevens & Co., 375 Broadway, New York, N. Y. Price quoted at request.

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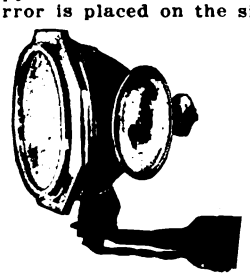


The Practical Drinking Fountain is a splendid thing for garages. The fountain serves city water at its natural temperature during the cool months of the year, and during the summer months if kept supplied with ice it produces a 20-degree reduction on city water. It is a refrigerating drinking fountain, embodying a Glauber Sanitary Bubbler. It is made of heavy iron, the ice chamber being of galvanized iron. Insulation is granulated cork.

The fountain holds a 75-pound cake of ice, which will usually last about three days, and which, even under the most severe conditions, will run the fountain a day. It has a 40-foot coil, always submerged in melted ice water, making it an instantaneous cooler. Being connected to waste and supply pipes, it requires no attention.

Manufactured by the Glauber Brass Mfg. Co., Cleveland, O. Write for literature and prices.

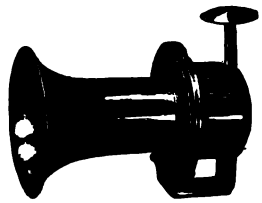
The Windshield Spotlight is of very rigid construction, can be moved to any angle and will stay in position regardless of the severe vibrations and jounces to which it is subjected. It has an octagon front, which gives a distinctive and ornamental appearance. A four-inch diminishing mirror is placed on the side of the



body of the lamp and a very slight movement of the hand turns it into position for rear vision. It is equipped with one of the latest type of switches; an upward push lights it and an additional push shuts it off. It is finished with nickel front and black enameled body. The door is six inches in diameter.

Manufactured by the Kilborn-Sauer Co., Fairfield, Conn. Price with four-inch mirror, $9; without mirror, $8.

Long Horn—The exceptionally compact mechanism of the model "3" Long Horn is of a new and improved design. It is mounted as a unit on its own bed plate, reducing to a minimum the possibility of the bending or buckling of the vibrator shaft and insuring rigidity and proper alignment of the working parts at all times.

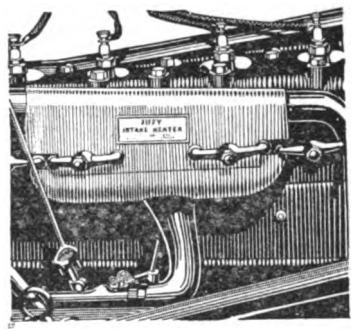


Long Horn

The gear train is so arranged as to secure ease of operation from the initial application of power throughout its range of action and to equally distribute the shock and strain of impact through the several gears. The vibrator shaft, therefore, is never subjected to sudden and undue shocks or strains.

Edward A. Cassidy Co., Inc., Madison Ave. at 40th St., New York, N. Y. Price, $3.50.

Jiffy Intake Manifold Heater. This is a heater for Ford cars that is attracting considerable attention. The intake heater is made of heavy gauge steel. It is held in place by the two center manifold clamps. Because of the fact that it quickly heats the intake manifold, it is claimed



that the gas consumption is greatly reduced, while the power of the motor is increased. The heater can be installed by a motorist himself in a short time and can be easily removed in summer months.

Manufactured by the Twin Fire Spark Plug Co., Detroit. Price quoted on request.

Victor Heater for Fords. Owners of Ford cars appreciate a good heater. The Victor Heater is built upon exactly the same tested principle as the hot air furnace, circulating fresh air over a heated drum and sending it upward. The drum of the Victor heater runs lengthwise, at right angles to the exhaust pipe. The exhaust, coming direct from the motor, is turned into the drum. Fresh air circu-



lates around the outside of the drum, is heated by the hot gases inside and rises into the car. A cone-shaped spring in the drum absorbs the force of the exhaust, acts as a silencer and at the same time radiates heat outward toward the heating surface.

Distributed solely by the Foreign and Domestic Auto Supply Co., 1765 Broadway, New York, N. Y. Price, $5; in Canada, $7.50.

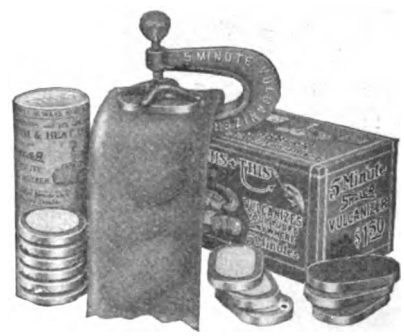


The General Cord Tire is of two-cure construction, expanded on a specially constructed air bag instead of the usual steel core. Every cord is expanded equally to the fraction of an inch, and the tire is cured while the cords are thus stretched to the degree that inflation on the wheel would have stretched them. Thus when the tire is inflated on the wheel, it is in the same condition that it was when cured. The rubber and fabric is not stretched; it gives naturally to road obstructions. The rubber does not cut, split, rim-cut or separate from the fabric, as in the case where inflation on the wheel puts the whole tire structure under tension.

The General Tire and Rubber Co., Akron, O. Prices from $42.30 to $87.40.

Shaler 5-Minute Vulcanizer. The demand for this wonderful Shaler vulcanizer has made it one of the biggest selling accessories ever put on the market. Its simplicity appeals on sight.

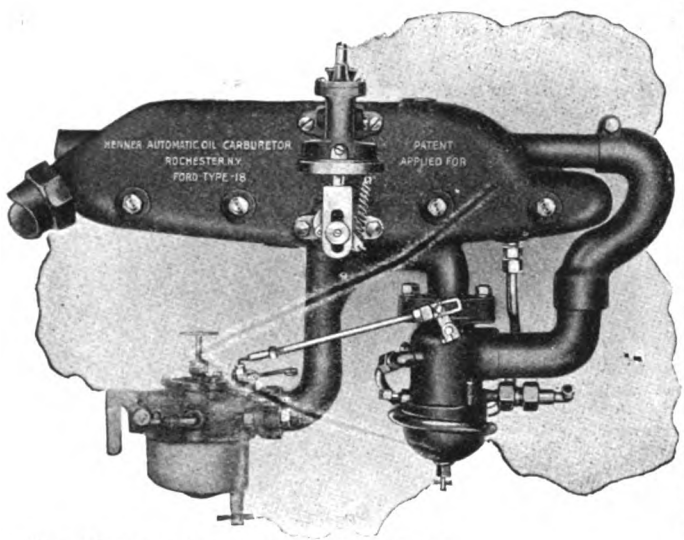
The Shaler 5-minute mends all tube punctures perfectly, making repair far superior to any "stuck on" patch. Also makes ideal repairs to rubber boots, hot water bottles, gloves, etc. Heat is produced by burning a non-flaming chemical heating unit. Each of the 12 patch units furnished with the outfit is complete in itself, consisting of the patent heat unit in its metal container, and the patch of raw rubber attached to the vulcanizing surface of the container. This cartridge is



clamped over the puncture and the heat unit lighted. In five minutes the repair is welded permanently in place and moulded to a feather edge. Only the patch is heated. Anyone can use it. There is no danger of overcuring. Each outfit includes nickel plated clamp and 12 patch units (six round and six oblong) packed in a display box. Weight, one pound. 12 outfits in carton.

Manufactured by C. A. Shaler Co., Waupun, Wis. Price, type M, No. 5, with 12 patch and heat units, retail at $1.50.

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The Henner Automatic System is for Ford car owners who desire to use coal oil as a substitute for gasoline. The Henner system, while simple in operation, is a very ingenious device which, while the motor is cold or is being started, is connected to its original gasoline carburetor, but upon being started and reaching a temperature sufficient to vaporize kerosene, the thermostat embodied in the system automatically turns a two-way valve and thus connects the motor with the kerosene carburetor. This eliminates the many adjustments and levers which are common in previous attempts to accomplish this result. The advantages are claimed to be less than half the expense of gasoline, less carbon, smooth running and no odor.

The Henner Automatic Oil Carburetor Co., Inc., 1000 East Main St., Rochester, N. Y. Price complete f. o. b. works, $55.

Radiator Neverleak is entirely different from all other preparations for stopping leaks in radiators. It is a liquid which

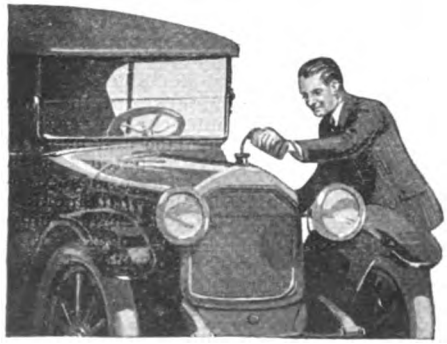


mixes readily with water. It is scientifically compounded, is guaranteed to contain no acid or any injurious chemical, and it will not clog or impair the cooling system.

It will stop all ordinary leaks in automobile radiators in from five to 10 minutes. It makes a permanent repair by forming a coating the thickness of paint on the outside of break, which coating will dry over night, and is not again soluble by heat, cold, water or alcohol.

After adding the Radiator Neverleak to the water in the radiator and the leaks have been stopped, it is not necessary to change the water. Leave it in, because the Neverleak will not evaporate or lose its strength and is, therefore, always ready to automatically close up new leaks. Alcohol, but nothing else, may be used as an anti-freeze with Radiator Neverleak with perfect safety.

Made only by Buffalo Specialty Co., Buffalo, N. Y., U. S. A.; Bridgeport, Ont., Can. Price, 75 cents.

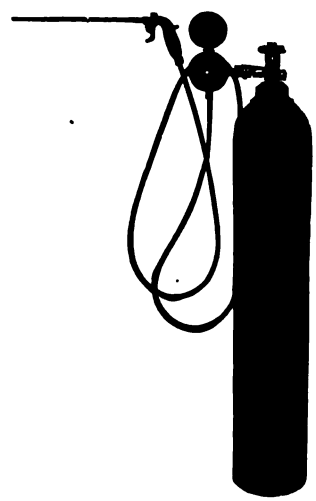




The "Electromatic" Door Opener can be installed on any opening where the head room is 12 inches or more. The mechanism is controlled by push buttons placed where they are most available. It is motor driven through worm gears to an operating shaft, reducing the number of parts, making practically a trouble proof device. Pressing the opening button lights the lights, unlocks the doors and folds them back clear of the opening. Pressing the closing button reverses the operation. Pressing the initial button stops the movement of the doors instantly. The buttons when placed out of doors may be operated with a cylinder lock. Simplicity and ease of application and operation are the features that predominate in this device.

Manufactured by the Allith-Prouty Co., Danville, Ill. Write for prices and catalogue.

Carbon Removing Outfit. The modern method of removing carbon from engine cylinders by the oxydization process is acknowledged to be both rapid and efficient, but to properly burn out the carbon good apparatus is necessary. The style A carbon removing outfit illustrated consists of a flexible copper nozzle torch, which is fitted with a specially designed,



quick acting trigger valve; a length of woven linen covered gas hose, with couplings at each end; a diaphragm type with hard rubber seat regulator, and a double connection, which is made to fit either ¾ inch straight pipe thread or standard Linde tank thread. Special attention is called to the improved design of the torch handle, which makes the use of it convenient since the flow of gas is easily controlled by the action of the trigger.

Manufactured by the G. H. Dyer Co., Cambridge, Mass. Price quoted at request.

The Gilbert & Barker T-30 Handling Outfit can be furnished as a unit or as a battery of units to handle several grades of oil. The pump measures accurately quarts or lesser quantities; fills the oil can without overflow or waste. A drip pan returns the oil accidentally spilled; a stick gage shows the approximate contents of the tank and a lock safeguards the supply.

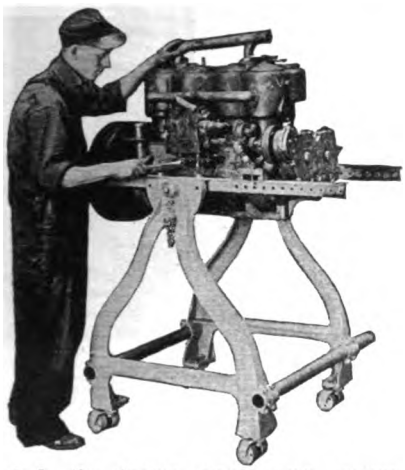
Manufactured by Gilbert & Barker Manufacturing Co., Springfield, Mass. Prices quoted at request.



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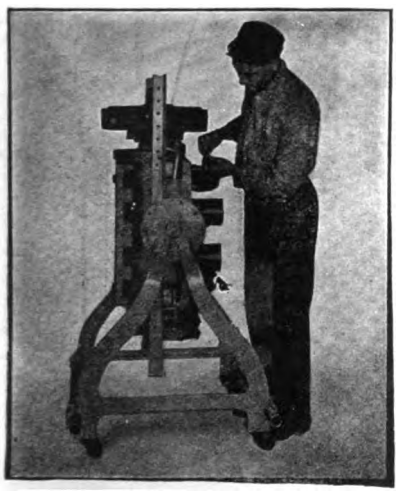
The Continental Motor Stands handle all types of motors and is a real universal motor stand. Every facility should be given the mechanic so that he can work without stooping, bending, twisting or lying on his back on a dirty floor.

An engine in the Continental motor stand is properly supported so the mechanic can turn it to any position so any part can be brought to such position that work is convenient and good light available. The engine can be completely in-



verted, the lower crank case removed, which gives a position for scraping-in bearings—and such work as requires considerable time—of just the right height for convenience and good workmanship.

Continental motor stands can be turned to any desired position and solidly locked with a steel pin. Over 25 different locking positions allow the motor to be brought to any desired angle. The motor revolving with the axis of rotation at right angles to the crank shaft gives a



range of adjustment that is ideal. The steel pins, you will note, are permanently attached to the stand by means of a chain that they may not be misplaced and are always at hand when needed.

Manufactured by the Continental Auto Parts Co., Knightstown, Ind. Write for prices and literature.

Norwesco Chemical Automobile Utilities. Norwesco products include the "Twelve-Twenty," which prevents frozen radiators; Skalex, a radiator cleaner, and Se-Ment-Ol, a radiator cement.

Alcohol solutions as a protection against frozen radiators have some points in their favor, but have one or two serious drawbacks. Alcohol evaporates very rapidly and so necessitates constant refilling of the radiator. Alcoholic solution constantly varies in strength and constantly varies in efficiency, so that one never knows to what degree his radiator is protected.

Salt solutions as non-freeze mixtures also have serious objections. They have a



tendency to "find" leaks—tiny holes through which the water will not pass. The leakage causes short circuits of the wiring system. Salt solutions have a tendency to crystalize and clog the systems when evaporation has increased their strength too much.

Norwesco "Twelve-Twenty" evaporates very slowly. It is safe and sure because it can be tested with an ordinary battery



hydrometer. There is no mixing or dissolving—it is simply poured into the radiator from the can.

Manufacturers of Norwesco products make numerous other chemical automobile utilities. Among these are Top Dressing, Mohair Top Dressing and Lining Dye, Utility Black, for preserving the appearance of a car; Carbonox, for removing the carbon from cylinders; Soldering Stick, Plumbers' Se-Ment-Ol, Soldering Salt, Valve Grinding Compound, Rim and Gasket Shellac, Never-Burn Engine Enamel,



Graphite Coating Rim Paint, Neatsfoot Clutch and Brake Compound, Automobile Furniture Polish, Prussian Blue, for use when scraping bearings; Fire-Fly, a chemical fire extinguisher; Pumice Hand Soap, Tire-Lac, Automobile Varnish, Aluminum Bronze, Tire Talc, Tire Mica and Soldering Paste.

Manufactured by the Northwestern Chemical Co., Marietta, O. Write for prices and literature.

The Continental Assembly and Welding Table is designed to speed up all types of bench work, lay out, inspection and welding. It is not necessary to lift the work that is being done off the table in order to get at the various parts, as the table may be unlocked and turned to the desired position so that the best light may be obtained with the least loss of time and motion on the operator's part. There is use for this table in every department from the tool room to the paint shop. It makes an ideal work bench or assembly table, and vices, jigs, etc., may be clamped direct to the table to adapt it to the required use. It may be used for continuous drilling operations by mounting several fixtures and loading and unloading one fixture while drilling in another.

The Continental assembly table is of substantial construction and well made. The table itself is heavy and well reinforced. It revolves on ball bearings, which makes it very easily moved, and the finished top makes it an ideal bench



for lay out and inspection. It has 36 locking positions, and is instantly locked or unlocked by the foot. The two sizes of tables are interchangeable and both tables can be furnished with one pedestal.

Manufactured by the Continental Auto Parts Co., Knightstown, Ind. Write for prices and literature.

Cork Insert Fan Belt for Fords. A belt that has unusual merit is the Advance Cork Insert Fan Belt, which retards overheating. Most motor trouble is the result of overheating. This belt does not slip, as



do ordinary fan belts. It is of durable construction and is economical because of its long wear.

Manufactured by the Advance Automobile Accessories Corporation, 56 E. Randolph St., Chicago, Ill. Price, $1 for 1917-18 Fords; 85 cents for 1916 and earlier Fords; Canadian prices: 1917-18 model, $1.50; earlier models, $1.25.

Black Gloss Enamel, a Blue Ribbon product, is for enameling automobile lamps, fenders, hoods, radiators and all metal parts. It is ideal for repairmen for enameling and retouching auto parts when the finish has been damaged or destroyed.

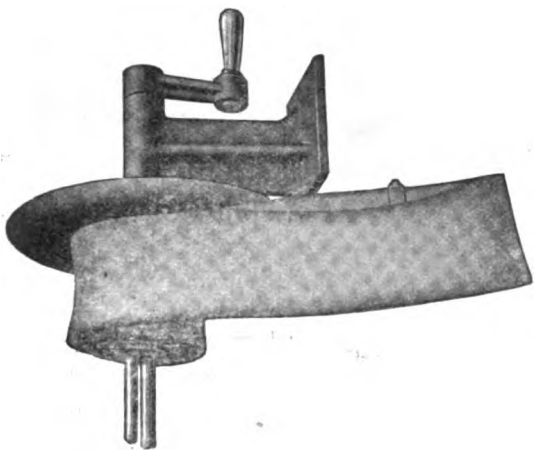


It gives a smooth, bright and lasting finish and dries within a few minutes. For ordinary work one coat only is necessary.

Manufactured by the International Metal Polish Co., Inc., Indianapolis, Ind. Prices: One-half pint, 45 cents; one pint, 80 cents; one quart, $1.50; gallon, $5.

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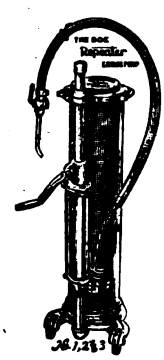
Miller's Combination Tape Wrapper and Tube Deflater. This device will deflate the average size tube in one-half minute. By removing the top pin, which is set in threads, the outfit is used for wrapping tape wrapper, used on tire when making cure on inside vulcanizers, and also for retreading purposes. A repair shop doing any amount of business can save the cost



of this tape wrapper and tube deflater in a very short time.

Manufactured by Charles E. Miller, Anderson, Ind. Price, $4.50.

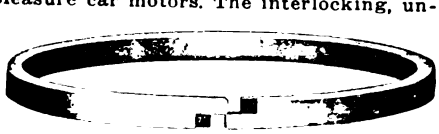
The Boe Combination Grease and Oil Gun is a quick, crank operated, gear action, rack and pinion gun. It is strong and durable, being built for hard work and rough use. The barrel is made from finest Shelby seamless 2⅝-inch steel tubing with self-acting tension plunger, which will load and discharge heavy as



well as light lubricant. All the gears and moving parts of the gun are enclosed, making the same an exceedingly convenient and clean gun to handle. The entire length of the gun is 31 inches. It weight is nine pounds and it has a capacity of 20 ounces to each pump stroke.

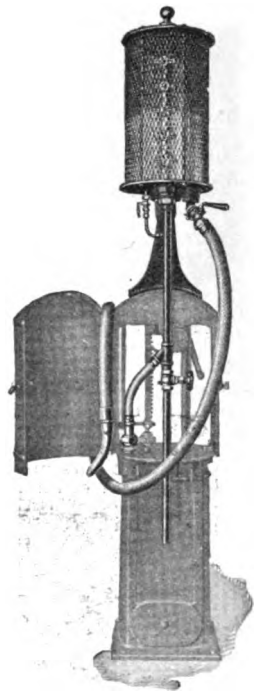
H. M. Boe Co., 2416 University Ave., S. E., Minneapolis, Minn. Price, $6.

The Taylor Leakage Proof Ring is designed to cure any Ford cylinder of loss of compression, oil throwing, carbon troubles or loss of power. It may also be used for many other makes of truck and pleasure car motors. The interlocking, un-



derlapping joint makes a perfect seal, which compression or explosion gases and oil cannot break. It is strong and durable, ground to accurate size, eccentric and one-piece and bears and wears uniformly. There are no points to break or catch carbon.

The G. H. Dyer Co., 155 Brookline St., Cambridge, Mass. Price, 50 cents.



The Groetken Visible Measuring Dome will convert a "blind" pump into a visible one. With its five-gallon capacity that fills, measures and empties in less than two minutes, it provides quick and economical service. Through the Groetken glass dome the customer sees that the quantity is correct. The old pump, to which the Groetken attachment is added, continues to be operated as before. The Groetken equipment is simple in construction and is easily attached to the old style pumps. It is attractive, being red enameled and nickel plated. All parts are easy of access. It is dust, rain and snow proof.

Manufactured by the Groetken Pump Co., Aurora, Ill. Write for literature and prices.

Eccolene. Gasoline economy—getting more miles from your gasoline—is of prime importance to every automobile owner today. Eccolene, it is claimed, saves gasoline, prevents carbon troubles, increases power, reduces overheating, lessens smoke and noise, produces better acceleration and a smoother, better running motor in every way.

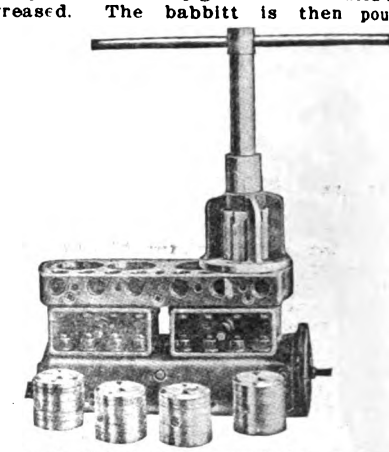
Eccolene, through a complex process termed decolization, makes gasoline vapor



more thoroughly combustible under compression in the motor cylinder. By decolizing the gasoline vapor Eccolene transforms a large proportion of the carbon forming elements, and at the same time assists the process of lubrication.

Edward A. Cassidy Co., Inc., Madison Ave. at 40th St., New York, N. Y. Quart size, $2; gallon size, $7.

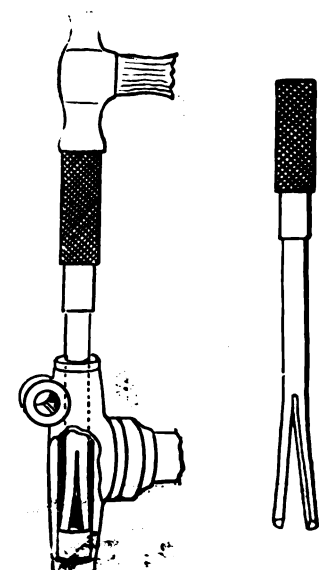
The Dyer Rebabbitting Jig for Ford connecting rod bearings is strongly and simply made and is inexpensive. The parts are few and well machined. No skill is required to rebabbitt rods. The jig is placed in a vise, the rod slipped on after one nut and the cap on the jig are removed and the journal of the jig has been heated and greased. The babbitt is then poured



through either of the two holes in the cap, the gases escaping through the other. The rod is held in place by a dummy wrist pin and a groove in the jig cap.

The G. H. Dyer Co, 155 Brookline St., Cambridge, Mass. Write for prices.

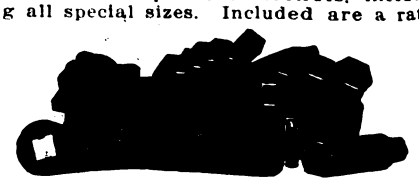
The Bushing Extractor quickly and easily removes the steering knuckle, spindle arm and spring bushings in a Ford front axle. It is made of steel and nicely finished. It may also be used for Ford, Dodge, Dort, Chevrolet and Overland cars.



It is valuable to the repairman and the owner who does his own work. When removing the steering knuckle bushings it is not necessary to remove the wheel.

The G. H. Dyer Co., Cambrdge, Mass. Write for literature and prices.

"Ideal" Set for Fords. The "Ideal" wrench set comprises 10 sockets, including all special sizes. Included are a rat-



chet handle, universal joint and extension bar. The tools are of durable construction and built to give long and satisfactory service.

Manufactured by Frank Mossberg Co., Attleboro, Mass.

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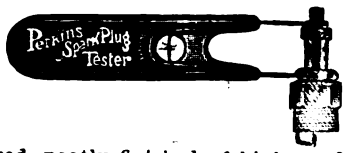
Duplex Fishing Creels. Duplex Fishing Creels are made of heavy waterproof canvas, reinforced with spring steel, rust proofed metal ribs and fitted with covers that fasten with pull down snap hooks. Air circulation is secured by metal eyelets inserted in front, sides and bottom and through the holes in the top. These creels may be kept sweet and clean by scalding in water, as by this process the fabric is not damaged. They are so designed as to



permit folding and may be carried in the pocket or tackle case when not in use.

Manufactured by the Planet Co., Westfield, Mass. Price quoted at request.

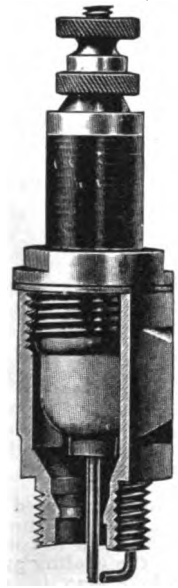
The Perkins Spark Plug Tester is made for the purpose of locating faulty ignition plugs and for setting the spark gaps in all plugs so that they will be in "tune." The tester is made in two colors, black



and red, neatly finished of high grade insulated composition. Using this device assures one of maximum efficiency of the spark plugs.

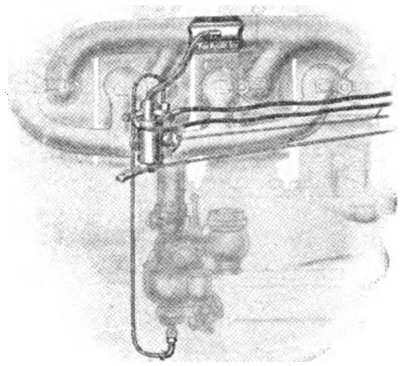
Manufactured by A. D. Perkins, 1777 Broadway, New York, N. Y. Price, 75 cents.

Sootless Plug. The J. M. Soot-Proof Plug is one of unique construction, having a double explosion chamber, with the sparking points extended well into the mixture. The engine end of the plug is well protected, having a porcelain cap, so



arranged and enclosed that it is protected against breakage by a metal housing. There are no asbestos packings used in the construction and it is said that compression and high pressure tends to tighten rather than loosen it. Being practically oil and soot proof, it is especially adapted for use in engines that use a large amount of lubricating oil.

Manufactured by the Oakes & Dow Co., Boston, Mass. Price quoted at request.



Perfection Five-in-One Vitalizer. An interesting device is being put on the market, designed for making the starting of an engine in cold weather an easy matter. This device is called the Perfection Five-In-One Vitalizer and may be attached to practically any gasoline engine.

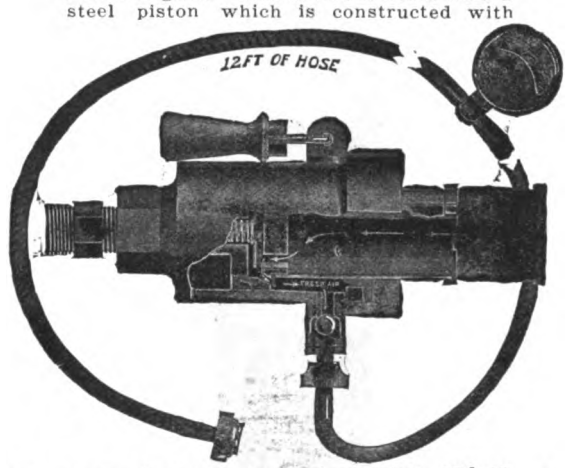
The device comprises a combination electric super-heater, a primer, an accelerator and an exhaust heater and decarbonizer, all in one. The electric superheater is controlled by a switch on the dash, draws current from the storage battery (or from four dry cells), and when turned on, instantly vaporizes a charge of gas for the engine, enabling one to start a cold engine very readily. The priming device is actuated by an arrangement which may be attached to the dash; the exhaust heater is had from the exhaust manifold through a flexible tube to the device.

The manufacturers sell the device under a broad guarantee and with the understanding that if it is not satisfactory it may be returned within 15 days from date of purchase and money will be refunded.

Manufactured by the Snyder Products Co., 4046 Washington Blvd., Chicago, Ill. Price, $10.

National Telescope Pump. Proper tire inflation pays big dividends and, conversely, poor tire inflation means big expenses. The average car owner pays but little attention to his tires so long as there is air in them, since the labor involved in using the hand pump is so great.

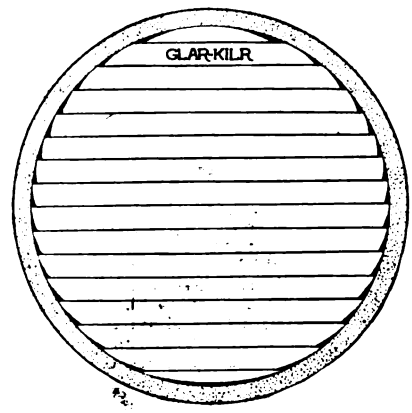
To make tire pumping easy and to utilize the power of the engine for the purpose, the National Telescope Pump has been designed. This device is fitted with a steel piston which is constructed with



rings, similar to an engine piston, and so designed that only fresh air is forced into the tire. It is screwed into the spark plug hole, where it may be left permanently when a shut off is used. With the device is furnished a woven cover air hose 12 feet long, a dial pressure gauge and fittings. The shut off comes extra.

Manufactured by the National Motor Supply Co., Painesville, O. Price, $9. Shut off valve, $1.25.

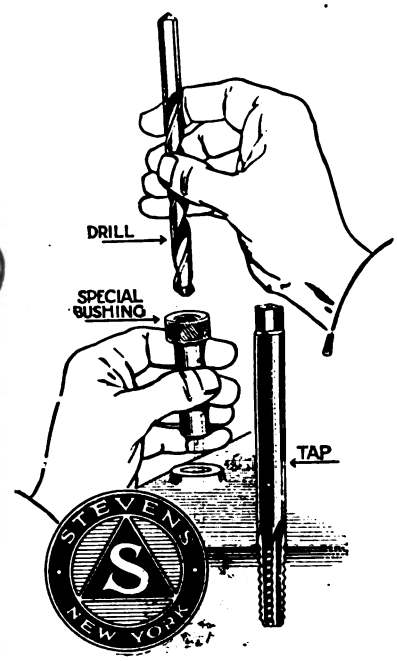
The Zorger Glar-Kilr Lens is composed of sectional cylinders one-half inch in width, with the axis horizontal. These sections are adjusted so that the rays cross or come to a focus three inches in front of the reflector. This gives a one-half inch spread every three inches or a two-inch spread every foot. The sectional cylinders are made so that the light does not attain an altitude of more than 42 inches in 200 feet. At 200 feet the spread



from each ½-inch section of the glaring half of the reflector is 400 inches, 90 per cent. of which is stated to be below horizontal is diluted by diffusion approximately 800 times, not nearly sufficient to dazzle an approaching driver. The maker states that by using the cylinder he gets the same diffusion as any diffusing lens and in addition gets refraction or bending down of the rays. This lens bends rays of light down and diffuses them along the road where they are needed.

Manufactured by the Zorger Lens Co., Inc., Champaign, Ill. Price quoted at request.

The Stevens No. 100 Cylinder Tap and Drill Set is designed to minimize trouble in removing broken pieces of cylinder head screws and consists of adrill, a tap and a



bushing, which fits the hole in the cylinder head. To use the set the bushing is put into place in the head and with this as a center the broken parts of the screw is drilled. The drill is of such a size that all of the screw body except the threads is removed and the balance is removed with the tap, leaving a tapped hole taking a screw the same size as originally.

Manufactured by Stevens & Co., 375 Broadway, New York. Price, $1.

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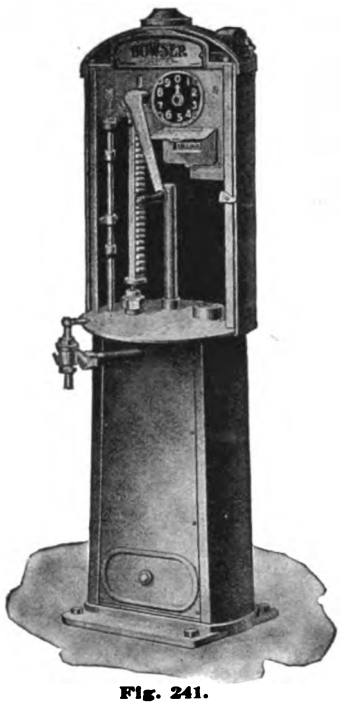


Fig. 241.

Bowser Pumps for Use with Underground Tanks are made for both outdoor and indoor use. The pump as illustrated by Fig. 241 pumps gallon, half gallon or pint. It locks, records and filters. This pump is for outdoor use.

The pump as illustrated by Fig. 243 is also for outdoor use. It is especially designed for kerosene and other light non-volatile liquids. It discharges gallons, half gallons and quarts. The pump records deliveries and locks.



Fig. 243.

Another pump for outdoor use is that illustrated by Fig. 245. This is especially designed for lubricating oil. It measures half gallon, quart or pint.

All of the Bowser pumps are so well made that they will give long and accurate service. The pump as illustrated by Fig. 101, which is for indoor use, is built entirely of metal, strong and durably constructed. All working parts are carefully protected by the outer castings and are machined and accurately fitted. All joints that come in contact with gasoline are absolutely tight, thus preventing accidental evaporation or leakage.

The cylinder is made of seamless brass tubing with no joints to break loose or cause trouble. The valves, valve seats, stuffing boxes, etc., are made of selected materials suitable for the liquids to be handled.



"Pacemaker."

This Bowser gasoline pump is so designed that it will accurately discharge on a complete stroke of the plunger five gallons of gasoline. Any intermediate gallon, half gallon or quart can be accurately discharged by the use of the graduated scale attached to the pump.

The Bowser "Pacemaker" pump is the latest outdoor gasoline dispensing equipment. It will discharge two gallons at a complete stroke or any intermediate quantity desired. The pump is built entirely of metal, strong and durable. All working parts are carefully operated by an outer opening, which is so arranged that there are no doors or slides necessary. It

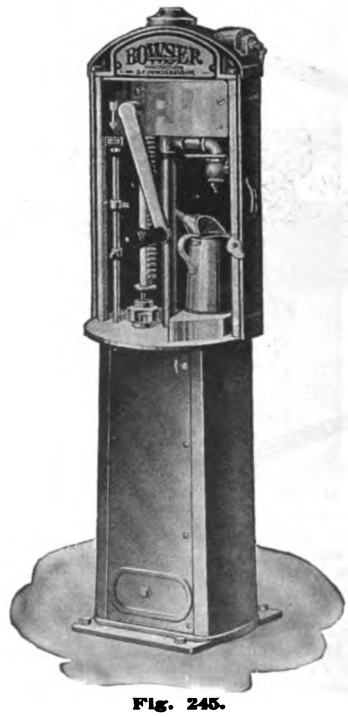


Fig. 245.



Fig. 101.

is provided with a double dial. A large disc is in plain view of the purchaser, which will avoid any dispute as to the quantity delivered. A small discharge register is in view of the operator. This pump filters, tallies individual deliveries and records totals. A white opal glass globe is placed at the top of the pump, which is wired for electricity.

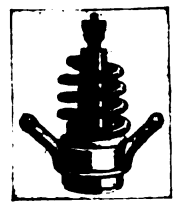
Manufactured by the S. F. Bowser & Co., Inc., Fort Wayne, Ind. Prices quoted on request.

The Burke Condenser for the cooling system of an automobile attaches to the filler of the radiator in the same place and manner as a motometer. It is made in the form of a miniature "still," similar in many respects to the device used in making "moonshine" whiskey. It consists of a conical shell with a relief valve at top, surrounded by a "worm" coil of copper tubing.

The shell receives all vapors, whether of water or of anti-freeze mixtures, which are driven out of the solution by heat. These vapors are restored to liquid form in condenser and returned to radiator.

The chief advantage of the Burke Condenser is the motorist can operate his car with the overflow pipe closed, preventing the loss of either water or anti-freeze mixture from splash or evaporation, with the result that alcohol, which is highly efficient as a freeze preventer, because of its low freezing point, can be used in the water without the usual danger of evaporation. It is claimed by the inventors that one filling of the tank with the proper percentage solution of alcohol will be sufficient to protect a car from freezing for an entire winter season.

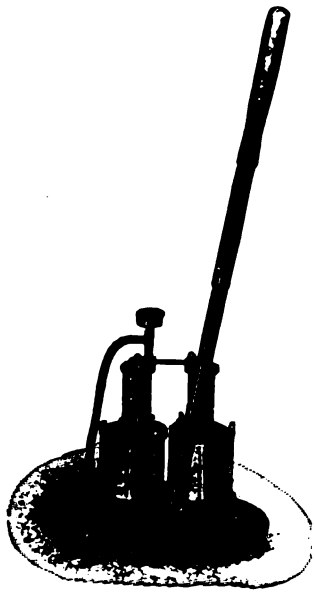




Another advantage claimed for this device is that it prolongs the life of the radiator and eliminates the need for constant refilling of the cooling system, which in turn goes a long way toward preventing the introduction of foreign matter and chemical impurities with the water, which are known to cause the formation of scale and rapid deterioration of metal parts with which they are brought in contact.

The Automobile Devices Co., Philadelphia. Prices: Standard model, $10, for all standard cars; Little Giant model, $5, for small cars; Ford model, $5, for cars of the last named type; Super-Giant model, $15, for trucks of all types.

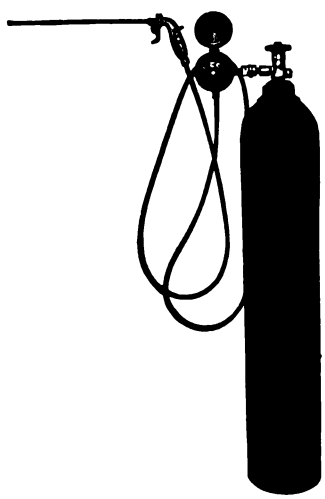
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"The "Dead Easy" Tire Pump has made innumerable friends because of the laborious work it saves. The slogan is, "Dead Easy Users Are Dead Easy Boosters." The pump is well made and gives long service. It does away with the back-breaking operation of the hand pump and a woman can easily operate it.

Manufactured by the Globe Manufacturing Co., Battle Creek, Mich. Write for literature and prices.

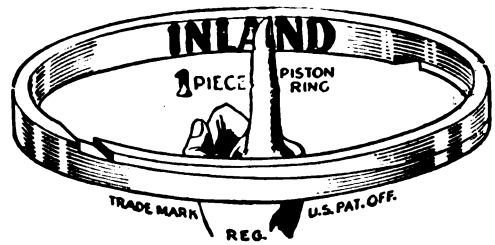
Dyer Decarbonizing Outfit is for cleaning automobile, marine and stationary engines using gasoline, kerosene or crude oil. The apparatus as shown in the cut is connected to an oxygen cylinder and when ready for use consists of a style A decarbonizing torch, oxygen pressure regulator, length of high pressure hose and



connections. The nozzle of the torch is flexible and can be bent so that it may be directed around corners and up into the cylinder head. One hundred cubic feet of oxygen will clean between 26 and 40 automobile cylinders with this outfit.

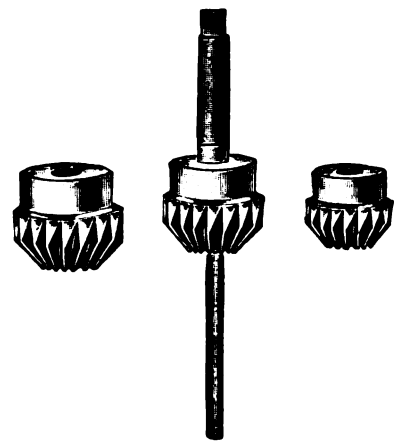
The G. H. Dyer Co., 155 Brookline St., Cambridge, Mass. Write for prices and literature.

Inland One-Piece Piston Ring. This is a new type, the objects in view having been to equalize the radial pressure of the ring against the cylinder wall all around the circumference and to obviate leakage through the cut in the ring. It is a concentric ring with the cut extending half way around the circumference. The ends are given an elliptic form to reduce their outward pressure. Such a ring most nearly fills the ring groove and requires a minimum depth of groove for a given pressure against the cylinder wall, which is important in these days of high speed engines with light reciprocating parts.



Manufactured by the Inland Machine Works, Eighth and Mound Sts., St. Louis, Mo. Prices, $1.25, $1.50 and $1.75.

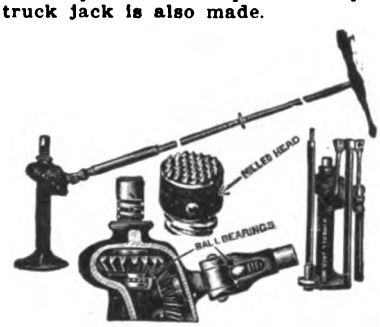
Sioux Valve Seat Reamer. This refaces the valve seat perfectly. It removes all carbon pits and irregularities. It faces the seat at the right angle and reduces the time needed for valve grinding several times. The reamers may be had in 30, 45



and 60-degree angles and in any sizes to fit valves from one inch to four inches diameter. Pilot stems are provided in all sizes. A Sioux Ford Valve Seat Reamer is also made.

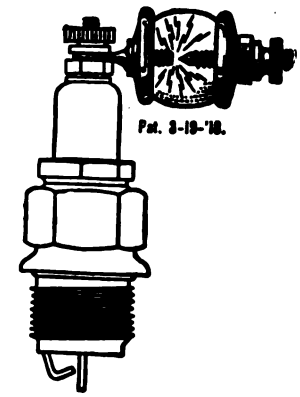
Manufactured by Albertson & Co., Sioux City, Ia. Write for prices and literature.

Kimball Jack. The Kimball ball bearing auto jack has a long handle, which permits lifting any car without getting under it. It has a diamond point hardened steel top with a bulldog grip that holds anywhere, on any bolt, spring or clip. The ball bearings carry the lift and thrust reduces friction and make jack work easy. There are no pawls, no ratchets, no kick-backs or handle blows. The ball socket holds the handle rigid while sliding the jack under the car and prevents it falling over. The Kimball jack is so constructed as to allow its free use in limited and inaccessible positions. A special heavy type or truck jack is also made.



Kimball Jack

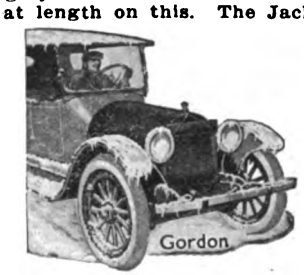
Edward A. Cassidy Co., Inc., Madison Ave. at 40th St., New York, N. Y. Kimball Jack, price, $7; truck jack with 44-inch handle, $15; extra 18-inch sections for truck jack handle, $1.



The Marvel Spark Plug Intensifier overcomes ignition trouble with internal combustion engines. The spark that is produced at the point of the spark plug when the spark gap is in series with the spark plug, results in a fatter, stronger, better spark than would otherwise be produced. The spark produced with the gap permits the use of a leaner mixture, that not only saves gasoline, but also cuts down carbon deposits in the cylinders. This is because carbon comes largely from the partially burned gasoline, resulting from the use of too rich a mixture.

Manufactured by the Universal Manufacturing and Sales Co., 552 West Harrison St., Chicago, Ill. Prices quoted on request.

Jack Frost Radiator and Engine Robes. The advantage to be found in the use of the radiator cover is becoming so thoroughly known that it is needless to dwell at length on this. The Jack Frost



Radiator Cover keeps the warm air in and the cold air out, and effects much better engine operation and makes starting easy. It prevents freezing and also stops rapid expansion and contraction of finely adjusted parts.

Manufactured by the J. P. Gordon Co., Columbus, O. Write for literature and prices.

Carbonox. There is no longer any need for going to the expense of scraping cylinders and pistons to remove carbon. An application of Carbonox will do the work in 30 minutes. Simply pour it into each cylinder, leave for 30 minutes and start



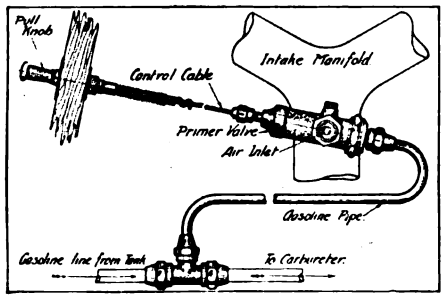
your engine. The carbon will have been loosened and will blow out through the exhaust. Use it after each 500 miles. A can cleans the average six-cylinder motor three times. Carbonox does not make a motor hard to start. It is advisable, however, to pour a litle oil through the priming cups before starting.

Manufactured by the Northwestern Chemical Co., Marietta, O. Price, pint cans, 75 cents.

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The Copley Primer affords a ready and simple method of getting a charge of gas into the cylinders as a means of immediately getting action out of the engine without waiting for the various functions of the carburetor to start operating and without overworking the starting motor.

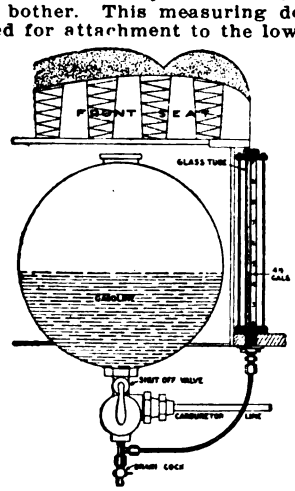
It is not a device to be used only in cold weather, but a permanent addition to the fuel system attached to the engine. The primer proper is attached directly to the intake pipe of the engine, and is connected with the gasoline line back of the carburetor. The priming valve is opened by a pull knob on the dash and closes itself automatically when the dash pull is released. The priming charge is drawn in by the engine, automatically regulated in amount and speed by the suction of the engine. Instead of raw gasoline alone it uses air also in carefully determined amounts and at very high velocity insuring a highly explosive charge. It is continuous in its action, delivering a steady flow of priming charge sufficient to run any motor without gas from the carburetor.



It is simple in form and can be installed in half an hour.

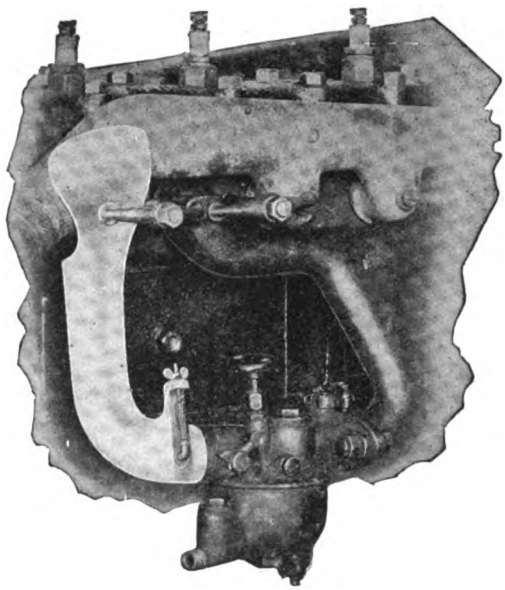
Manufactured by the Bay State Pump Co., 100 Purchase St., Boston, Mass. Price, $5.

National Gasometer. Have you often wondered just how much gasoline you had in your Ford car tank, yet didn't want to go to the bother of removing the cushion, tank cap and measuring the gasoline height? If your car is equipped with a National Gasometer you will not be put to this bother. This measuring device is designed for attachment to the lower part of the standard Ford gasoline filter fitting and requires no alterations to apply. The gauge is mounted on the floor board, directly in front of the seat. The gasoline level can be told at a glance.



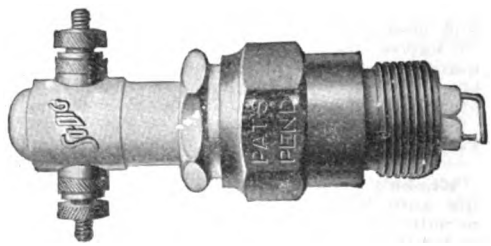
Manufactured by the National Motor Supply Co., Cleveland, O. Price, $1.50.

The "Ritemix" Gasoline Economizer and Compensator is a carburetor air heater and regulator for the Ford engine, consisting of a scientifically constructed air valve fitted into the opening of a specially designed pipe which replaces the regular hot air pipe leading to the Ford carburetor. This device has an exceptionally large flange, which fits over the top of the exhaust manifold, preheating the air about 200 per cent. in excess of the amount heated in the original hot air pipe. The valve moves with each pulsation of the engine and supplies a uniform amount of air at all engine speeds, thus insuring a proper mixture of gasoline and air at all times. It can be installed in two minutes time by anyone without boring or fitting and requires no attention when once installed.



Manufactured by the Perfection Auto Parts Co., 2130 Superior Ave., N. E., Cleveland, O. Price, $3.50.

The Su-Dig Series Plug is a special double electrode plug, made to operate in series with the regular single spark plug, thereby producing greater power in both "T" head and "L" head engines, by causing two simultaneous sparks in each cylinder.



It is wired in series with the ordinary spark plug. Instead of having one grounded electrode this plug has two electrodes, both of which are insulated. The top of the plug has a terminal connected to each electrode.

One terminal of the Su-Dig Plug is connected to magneto or battery, and the other terminal is connected to the ordinary spark plug; thus the current passes through both plugs in series, the spark occurring in both plugs simultaneously.

Tests made with this system of ignition have shown an increase of 17 to 21 per cent. in power and a decided increase in gasoline mileage.

Su-Dig Series Plugs are manufactured by the Superior Motor Power Co., 135 Fifth Ave., New York.

The Egry Register System gives a complete record of each day's business with a perfect control over all charges. It safeguards all cash transactions, thus avoiding all unpleasant disputes. It causes the customer to automatically become a part of the system; aids in stock accounting and keeps you posted on all the details of your business by means of a secret record of each transaction, overcoming the element of worry and waste and creating efficiency.

Manufactured by the Egry Register Co., 431 Monument Ave., Dayton, O. Write for prices and literature.

The Presto Electric Heater should be of great interest to motorists who plan to run their car during the winter months, yet are unable to afford a heated garage. This device is an electrical engine heater called the Presto and operates upon ordinary electric house current. It measures 12 inches in length and is designed to hang under the hood, near the carburetor or radiator, distributing the heat where it is most needed. With the heater is furnished 10 feet of cord and an attachment plug for any electric light socket. It may be used on 110 volt current, either direct or alternating. The manufacturers claim a very low cost per hour operating this attachment and say that with it the engine is kept to an operating temperature, regardless of outside temperatures.

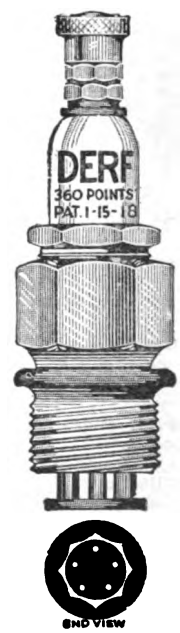


Manufactured by Metal Specialties Manufacturing Co., 338-352 N. Kedzie Ave., Chicago, Ill. Write for prices and literature.

The Derf Spark Plug is of simple construction. The insulator is composed of a scientific compound known as "lavette" and is practically indestructible. It is not affected by the severest conditions of heat, speed or high compression. The electrode, which is extremely large, terminates in a disc. This disc is surrounded by an earthed ring, which is supported by posts and is provided with internal notches, giving 360 points of ignition, the rapid and hot spark easily burns oil and fires every bit of the mixture. The Derf plug runs on a leaner mixture than ordinary types of plugs. The makers guarantee that no carbonization takes place on point of ignition.

In the test of motor fuel economy devices held under the auspices of the New York Herald several weeks ago, a Mercer four-cylinder car, 1914 model, equipped with a set of Derf plugs, covered a total of 1000 miles on 58½ gallons of a mixture of half gasoline and half kerosene, averaging 17.1 miles per gallon. The car, equipment and load during the test weighed 4000 pounds.

Manufactured by the Derf Manufacturing Co., Gerken Building, 90 W. Broadway, corner Chambers St., New York City. Price, $1.50.



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ENGINE LIFE AND LUBRICATION

Only Adequate Supplies of the Best of Oils Will Afford the Full Degree of Power and Minimize Wear and the Repair and Maintenance Expenses.

TWO widely differing influences cause deterioration of power vehicle, the one being friction, which results in wear, and the other vibration, which causes what is known as metal fatigue and loss of strength to the point of fracture. Could these two be prevented the automobile chassis would endure indefinitely, and it would afford service with practically no expense other than for fuel and lubricant, with occasional renewal of finish and changes of tires according to the mileage driven.

Friction is defined as a resistance to motion, or to a tendency to motion, between two surfaces in contact; called also external friction. There are different forms of friction, such as internal, sliding, rolling, solid and combinations of these. A general statement may be applied to this effect: When the bodies in contact are at rest only so much friction is called into play as is necessary to prevent motion. As the conditions are altered so that the tendency to motion increases, the friction also increases up to a point when motion ensues, when it remains unaltered (for true solid friction). The friction occurring just on the point of motion is called limiting friction. The energy expended in overcoming friction is usually converted into heat.

Friction always exists between contacting surfaces, whether moving or motionless, and wear obtains that may be dependent upon the character and quality of the metals, the form, finish and proportions of the moving parts, the loads carried, the speed of movement and the degree of lubrication. All of these factors have been considered by the engineers who designed and constructed the vehicle and even the quality of lubricant that will serve best has been determined. So one will understand that maintaining the highest degree of lubricity is extremely important.

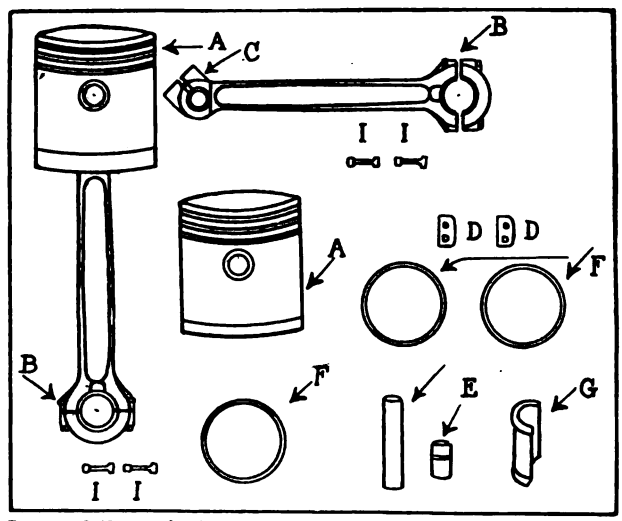
Lubrication Reduces Wear.

While wear will result when the moving surfaces contact, no matter how perfect the lubrication may be, this wear may be reduced to such a point that it will be practically negligible through absence of abrasives and the maintenance of what are known as "oil films" between the surfaces of the parts. The "oil film" is really a cushion of oil on the surfaces, and if the oil or grease is such quality that it will not be forced from between them by pressure and it will sufficiently separate them so that there will not be resistance, it will minimize wear.

Under a microscope the most highly polished metal surface appears rough, something like the roughened side of a nutmeg grater, and there are alternating points and depressions, minute, to be sure, but still a very substantial resistance to movement. The purpose of the lubricant is to fill these depressions so that there will between the surfaces molecules of oil or grease that serve the same purpose and have the same effect that is obtained by the use of balls or rollers. Unless the film is maintained adequately there will be increased resistance to movement. There will be friction proportionate to the area of the surfaces and the load upon them, but the use of balls or rollers will be effective in that it transforms sliding friction to rolling friction when contrasted with other forms of bearing surfaces.

Friction of Moving Parts.

The wear of the engine from friction is confined to the moving parts, which include the cylinder and piston walls, piston rings, wristpins, piston bushings, connecting rod bearings, crankshaft and camshaft journals and bearings, timing gears, cams, valve tappets, valve tappet guides, tappet adjusting screws, valves, valve guides, oil pump, fan shaft and bearing, water pump, magneto and perhaps water pump shafts, the generator, motor, parts of the ignition system, the carburetor control linkage and possibly other auxiliaries. There may be a tire pump, for instance, or such other equipment or accessories that the owner would care to utilize.



Some of the Principal Wearing Parts of the Engine: A, Piston; B, Crankpin Bearings; C, Wristpin Clamp of Connecting Rod; D, Crankpin Bearing Cap Shims; E, Piston Bushing and Wristpin; F, Piston Rings; I, Connecting Rod Cap Bolts.

Bearing surfaces are preferably of dissimilar metals, and usually plain bearings are softer than the shaft journals they carry. Ball or roller bearings have hardened surfaces. The cylinders are with rare exceptions cast metal, and cast iron will under friction take a very high polish, the surface becoming glass-like or glazed, the inequalities being largely reduced. Both the cylinders and pistons are subjected to high temperatures and what may be regarded as the extremes of expansion and contraction. Not only this, the pistons move in the cylinders at speeds of from 200 to 2000 feet a minute. The velocity is stated in averages, but as a matter of fact the extreme travel of the pistons is rarely as much as 15 inches, and the length of the piston seldom exceeds six inches.

High Speed of the Pistons.

In this cylinder length the piston attains its greatest speed, comes to a positive stop and again accelerates and stops, this cycle being repeated with each revolution of the crankshaft. Obviously, a part of each stroke the piston moves faster than the average speed. The friction is not of the entire piston, however, but of the rings against the cylinder walls, and much heat is generated.

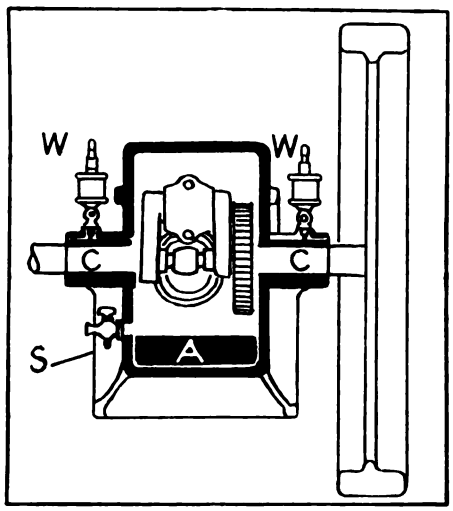
Besides this, the piston expands more than the cylinder from the fact that it is cooled only by the oil that is splashed or sprayed against it, and by the low temperature of the fuel gas that is drawn into the cylinder. The temperature of the burning gas in the cylinder may exceed 3000 degrees Fahrenheit for a portion of the explosion stroke.

The piston rings and cylinder walls will wear and the compression will be reduced. The purpose of the rings is to "pack" the cylinder so that the fuel gas, while being compressed and while being consumed during the explosion stroke, will be retained in the cylinder practically between the piston and the combustion head. If the compression is less than normal because of cylinder and piston ring wear the power output will be reduced. The lubricating oil serves the double purpose of minimizing friction and "sealing" the spaces between the rims and cylinder walls so the gasses cannot escape. There is every reason why extreme care should be directed to engine lubrication, for it is the main protection against wear and at the same time it is the principal requirement for engine efficiency and is the surest means of obtaining operating economy.

The Fit of the Pistons.

The better the fit of the piston rings the more positive will be the compression of the cylinders, there is less probability of leakage of gasoline into the lubricating oil, and the carbon formed below the piston head will probably be confined to accumulations of lubricant that has been partly consumed on the inside of the piston. The higher the quality of oil the better will be the general operation of the engine and one should remember that frequent drainage of the oil reservoir will remove sediment that has

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Typical Splash System of Lubrication: A, Oil Level; C, Crankshaft; S, Drain Cock; W. Gravity Drip Oil Cups on Main Bearings.

found its way into the engine with the oil, possibly from dust or other impurities in the utensil used for handling it, or drawn in through the "breather," or metallic particles resultant from wear of the engine itself.

The lower the temperature of the engine while it is running the less the probability of abnormal consumption of oil. If the engine is run slowly, as in traffic, where there is reduction of the efficiency of the cooling system, more oil will be used than if driven at considerably faster speed, and if the engine is driven fast for a long period the volume of lubricant necessary will be in far greater ratio than if driven at an ordinary road pace. Driving with retarded spark, which means reduction of the cooling system to lowest effectiveness, is certain to heat the engine to a point of excess. There should always be sufficient oil. The driver who believes he is economizing through the use of cheap oil is accumulating a repair bill of unknown proportions.

Guard Against Lack of Water.

Low water level in the cooling system is another cause for defective lubricity and all the attendant probabilities of engine wear or damage. The condition of the cooling system can be determined at all times by the use of a temperature indicating device that is attached to the filler cap of the radiator and should the red fluid rise suddenly above the point that is established for efficient operation the driver can take such precautions as are justified by conditions, such as stopping, filling the cooling system or replenishing the oil.

When engine oil is heated to where its viscosity is lessened its lubricating qualities are much reduced and wherever moving parts actually contact there is rapid wear, which may cause scored cylinders, "burned" bearings, worn journals and the like. To be sure cylinders can be rebored and fitted with new pistons and rings, new bearings can replace those destroyed and the shafts can be reground, but these cost money and besides other parts of the engine may have been more or less worn and require restoration to obtain what will be in all probability reduced efficiency as compared with the original condition. There is possibility of gasoline or kerosene reaching the crank case, where it dilutes the oil so that it has less lubricating qualities.

Defective lubrication or internal mechanical defects are easily detected by the driver who knows the engine of his car. He can distinguish by sound alone whether or not it is functioning normally. But any noticeable loss of power is sufficient reason for a careful examination to determine the cause. Possibly it can be ascertained by an external inspection, and again there may be need of going over it thoroughly and by a process of elimination learning the condition that requires restoration.

Effect of Worn Bearings.

Worn crankshaft and crankpin bearings cause a "knock" that is a distinct blow, as the explosion forces the connecting rod against the crankpin or the crankshaft against the bearing, which is always heavier as the load is increased. Such a condition is specially noticeable when ascending a grade, or accelerating on a level road. The bearings, being softer metal, will wear rapidly if not fully lubricated, and may be so heated that they will become plastic or even semi-fluid. In such an event the upper part of the connecting rod bearing and the lower part of the crankshaft bearing will show the greatest wear. They may be, in fact, practically destroyed. Should a piston "seize" in a cylinder the probable result will be a broken connecting rod and the end of the rod driven through the bottom of the crank case. Good lubrication would have safeguarded an accident of this kind.

Should a car stand in a low temperature the oil in the lubricating system, especially in the reservoir, may congeal or thicken sufficiently so that when the engine is started there will be a lack of lubricant at all the principal bearing parts. This condition may be more probable with force feed systems, where the pump may not draw sufficient oil to lubricate the bearings of the crankshaft, and much damage could be done in a brief time. There may be excessive pressure, or even no pressure, indicated by the sight feed gauge on the dash. No better advice can be given to watch the oil gauge as one watches the ammeter of an electric system.

Select a Good Standard Oil.

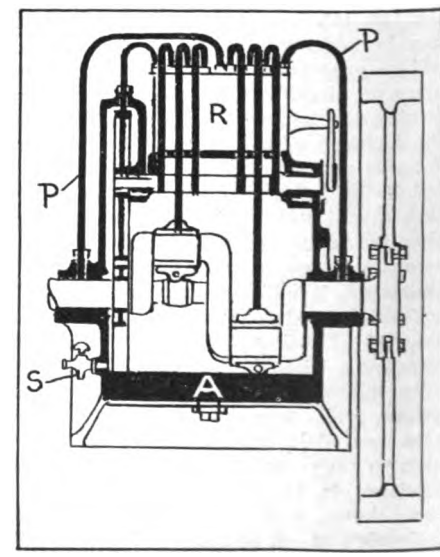
Oil that will afford good results in summer may be too thick or "heavy" for winter use. A light or more fluid oil is necessary. One should select a standard brand having a specific gravity of from 25 to 27 degrees Baume at 60 degrees Fahrenheit, a flash test of 430 degrees, a fire test of from 470 to 490, a viscosity of 80 at 212 degrees by Tagliabue viscosimeter, and perhaps a cold test of plus eight degrees, viscosity not above 180 at 10 degrees.

During cold weather the crank case should be drained every 300 to 500 miles because more or less gasoline will become mixed with the oil, as only a part of the fuel is consumed when starting the engine and what is not consumed will descend past the piston rings and reach the crank case and the oil reservoir. Many owners neglect this precaution and drive thousands of miles without removing the oil. The oil reservoir should be emptied, a gallon of kerosene poured into it through the breather, and the engine should be turned for 30 seconds or more with the motor or hand crank. The kerosene should be drained from the reservoir and when it is thoroughly free of this oil fresh lubricant should be put in. The lubricant taken from the reservoir can be filtered and used on other parts of the chassis, on the springs, shackle bolts, steering knuckles and for other purposes where a high quality oil is not required.

Water May Affect System.

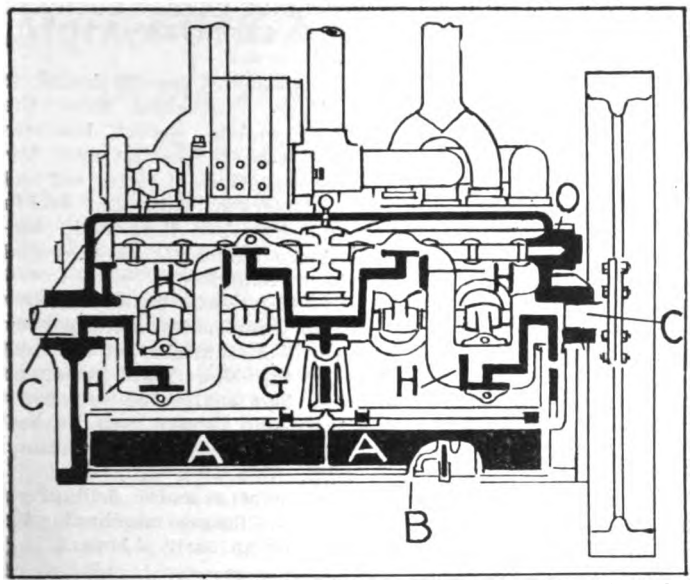
Sometimes water is formed as a product of combustion, and this may pass the pistons and rings and reach the crank case, and eventually the oil reservoir, finding the lowest part of the lubricating system, which may be the pump sump or well. A sufficient volume of water may accumulate about the screen around the pump intake and in cold weather this might freeze sufficiently to obstruct the circulation of oil. More water is formed from combustion in cold weather than in warm and in ratio to the number of cylinders of the engine. In the spring, summer and autumn the water might not have any effect and it would collect in the oil sump and be drained with the oil when the lubricant was renewed.

Car, truck and tractor manufacturers have carefully determined the quality of the lubricants that are best suited for the machines they build, and the recommendations made to purchasers is not with the purpose of advising that they spend money needlessly. To the contrary, the builders are especially desirous of the owners obtaining the best and most economical service that is practically obtainable, and their advice is to be regarded as having adequate reason. There is no economy in using what may be cheap in price, for there is value to quality in oils as in any other manufactured product, and what is sold for low prices is dangerous to use, especially when the entire



Separate Force Feed System: A, Oil Level; P, Leads to Main Bearings and Drips to Camshaft and Crankpins; S, Drain Cock.

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Force Feed System: A, Oil Level; B, Intake of Pump; C, Main Bearings; G and H, Channels in Crankshaft for Distribution of Lubricant to Bearings.

service of a costly vehicle is dependent upon it. The buyer may accept that the maker of a high grade lubricant sells it as cheaply as its value will justify and good oils are usually so sold that there can be no mistake made by nor imposition upon those who demand them by supply dealers.

Only Quality Oil Will Serve.

Oil must have quality to serve in an internal explosion engine. It must have sufficient body to maintain a film in bearings under heavy pressure, and it must be as fluid as is consistent with the first requirement, so that there will not be the resistance that is found with heavy, sticky oil or grease on a light, high-speed bearing. It must retain its normal body and not become thin in use and fail during long continued operation of the vehicle. The best steam cylinder oils are not suited for gas engine cylinders, and an oil that may give good service for bearings may be a poor lubricant for gears. The grease that leaves nothing to be desired for a constantly cool bearing may be absolutely insufficient in the bearing exposed to heat from other parts, as the cylinder walls, for instance.

Vegetable and animal oils are to be avoided entirely, because of the probability of acid forming through chemical changes, although free from acid when manufactured. A test for acid in a lubricant is to place a few drops on a piece of blue litmus paper, and if the paper becomes red it contains free acid. Another test is made with a piece of highly polished steel on which is wrapped threads from waste or yarn that have been saturated with the oil. The steel should be exposed to the rays of the sun in a fairly warm place. Oil or grease free from acid will show no etching on the steel, even after months of exposure. If acid is present in the oil this will be evident in a few hours.

No Oil Free from Carbon.

Oil that is free from carbon is not obtainable—that is, it is not refined—there being no practical process that will remove all free carbon from the crude or base oil. Were all carbon removed its value as a lubricant would be lost. Generally speaking, oils that are light in color will cause the least carbon when consumed. What is known as carbon is the residium of oil that is not consumed, with dust drawn into the engine through the carburetor, impurities taken into the gasoline tank when filling, from careless handling, accumulations on containers and measures, failure to clean the fillers of tanks, etc., and other foreign matter that is carried into the engine with the lubricant, often when replenishments are made. There is also more or less metallic particles from the wear of the different contacting parts.

All these impurities and foreign matter will, if not ejected through the exhaust, adhere to the oily surfaces of the combustion chamber, the piston head and the valves and valve seats. The oil is eventually consumed, leaving the dried mixture baked on the metal. This serves as a base for accumulation that continues until removed by burning (which thoroughly dries the coatings and causes them to flake off), or they may be removed by scraping or by other processes. Carbon deposits do not cause the metal to deteriorate, but where the accumulations have points or edges these may become incandescent from heat and cause preignition and the attendant "cylinder knocks."

Use of Lubricant for "Running-In."

When a bearing is new, no matter how carefully fitted, the surfaces are more or less irregular and do not uniformly contact. Perfect contact in the engineering sense is not obtainable until the irregularities have been worn away. When a shaft is ground with the greatest care and a bearing is die cast and has true contour there will not be perfect contact. The only practical method of improving the bearing to minimize friction is by "running-in," which means turning the shaft in the bearing with adequate lubrication. Until the process is completed, which may require considerable time, a thinner oil must be used that will flow between the surfaces of the shaft and the bearing. A thicker, heavier oil might not find its way into the bearing and fully lubricate it, and for this reason there is some danger in its use. So long as the thin oil is used in abundance there will be no damage, no matter what the condition of operation. Some authorities maintain that a car must be driven from 500 to 1000 miles to be completely "limbered" with reference to the fitted bearings, but this does not apply, of course, to roller or annular ball bearings.

The lubricants used for power vehicles are, generally speaking, three grades or qualities, one comparatively light for the engine, a heavier or semi-fluid oil for the transmission gearset, differential gearset and the wheels if they have ball or roller bearings, and, in some cases, a heavier grease for some transmission bearings and universal joints.

Some Lubrication Systems.

Some of the methods for supplying lubricant to the power plants are worthy of consideration. Feeding the oil to the bearings by individual leads from a common reservoir, a method that was once used to some extent, is wasteful and unreliable. When gravity feed is used the pipes are comparatively large and the oil as it runs from the bearings is drained to a well in the crank case or the lowest point of the system, and thence is pumped back to the reservoir for redistribution. This is known as flood lubrication. A variation of this system is to place the oil reservoir in the base of the crank case and force the oil from it by a pump through small ducts to all parts to be supplied with oil. This system should be classed with the force feed type, which may be divided into those in which the pressure for forcing the oil is obtained from the exhaust, and those that have some form of pump to force the oil through the leads to the different parts to be lubricated.

In the exhaust pressure system a small pipe is tapped into some part of the exhaust pipe of the engine and run to the oil reservoir, there being a check valve in the line, and the pressure from the exhaust causes the check valve to open, there being in the oil reservoir approximately what is the maximum pressure in the exhaust pipe. This pressure forces the oil from the reservoir through leads to the bearings and other parts to be lubricated. The oil passes through a gauge that is usually provided with eight drips, so that the oil being fed to any bearing may be observed and regulated. When the engine is not running there is no pressure in the reservoir after the reduction of what had been generated when the engine was stopped. The oil feed may be said to be proportional to engine speed.

Mechanical Force Feed.

The third system is known as the mechanical force feed, the main principle of which may be applied in many ways. This forces the oil into pipes running from the pump to the different bearings, etc., and the pumps may be either the plunger or other type. The pumps are contained within the tank or reservoir and are driven by revolving shafts extending through the sides of the tank and turned by gears, chains and sprockets or belts by the engine. The shaft is driven at a comparatively slow speed. When one pump serves it lifts the oil from the bottom of the tank to a tube through which is passes to the sight drips and by way of pipes to the bearings. Instead of a single pump a number may be used—one for each lead from the reservoir, and the oil may not pass through the sight drips. In case the oil passes through drips it is

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no longer under pressure and must be fed by gravity. To insure pressure feed and to obtain the advantage of a sight gauge, which is obvious, the master pump and feed system is used.

Master pumps lift the oil so that it may pass through the sight feed drips and then the feed pump receives it and passes it through the leads to the bearings or other moving parts.

All oiling systems, regardless of type, require overhauling occasionally, which includes adjusting and cleaning the various leads or pipes with a flexible wire, and the lower part of the crank case should be removed and the interior scrubbed with kerosene and a stiff brush. The gaskets may be used again, but the safer plan is to replace them with new, which will be an insurance against leakage. The cost of gaskets is slight, or one may make them from heavy wrapping paper, using the old gaskets for patterns. Care should be taken to use a sharp knife for cutting the paper, and the paper should be well coated with shellac or red lead before applying. The nuts of the crank case should be tightened evenly before the shellac dries.

PLAN PREVENTION OF HIGHWAY ACCIDENTS.

The introduction of motor trucks into the commercial life of the nation, which is taking place on such a large scale, tends to increase the possibility of street and highway accidents. The Highways Transport Committee of the Council of National Defense takes cognizance of this fact in launching a nation wide movement looking to a reduction of the number of accidents resulting from carelessness either on the part of the drivers of vehicles or of pedestrians.

The committee will carry on the campaign through its regional, state, district and local organizations. In this work it has the assistance of leading authorities throughout the country. The National Highway Traffic Association, recently organized for the purpose of advancing the efficiency and regulation of highway traffic, has indorsed this activity of the Highways Transport Committee.

It is planned to have highway regulations more generally adopted by authorities and copies of these regulations made easily available to the public.

STEWART-WARNER PROFITS.

The annual report of the Stewart-Warner Speedometer Corporation for the year ended Dec. 31, 1918, shows net profits, after expenses, depreciation and Federal taxes, of $1,594,665, a decrease of $266,109 from the preceding year. The earnings are equivalent to $15.94 a share on the $10,000.000 capital stock, as compared with $18.60 a share in 1917.

Net earnings of the company for 1918 were $2,002.646, a decrease of $232,178 from the 1917 figures. Federal taxes took $407,981 of these earnings. The year's surplus was $994.665, as compared with $1,267,774 in 1917. The total profit and loss surplus of the company now stands at $6,450,880.

TRADE COMMISSION CITIES REMADE AUTO TIRE MEN.

The Federal Trade Commission has cited E. P. Jones and S. A. Paul and four concerns alleged to be operated by them in New York City to appear before the commission in Washington, March 11, to answer a complaint that charges them with attempts to "deceive and mislead the public" in selling off remade old automobile tires as new tires.

The concerns, the commission states it has reason to believe, purchase old and discarded automobile tires, cause them to be repaired and coated with a thin coating of rubber or composition of similar appearance, thus removing the name or brand of the original maker and restamp them with new names or brands with the purpose of misleading and deceiving purchasers into believing the tires are new tires.

The commission points out that "it is the belief and impression among dealers and consumers and the purchasing public generally that automobile tires having the appearance of, and sold as new and unused tires, are manufactured from new and unused material. The concerns, it is charged, have "at all times" concealed and wholly failed to disclose that their tires are remade.

In addition, the complaint charges false representation in advertising, put out by the concerns that their tires were guaranteed to run 4000 miles, when "they well knew that said tires have been worn and discarded before being coated with the thin film of rubber or composition."

PREDICTS MOTORCYCLES WILL BE POPULAR.

There was only one motorcycle exhibit at the New York automobile show, but, nevertheless, the Motorcycle and Allied Trades Association is expecting a great advance in motorcycle activities this year. During the war the government bought 65,000 machines. From five to seven men were developed as drivers for each machine, which means that in our army there are something like 300,000 trained riders, experienced in the care and upkeep of motorcycles.

The association, of which H. S. Quine of the Goodyear Tire and Rubber Co. is president, believes that many of these soldiers from overseas will buy machines for their personal use.

SLOAN JOINS MITCHELL MOTORS CO.

E. L. Sloan, district sales manager of the Reo Motor Car Co., Lansing, Mich., and identified with that company for 10 years, has accepted a similar position with the Mitchell Motors Co., Inc., Racine, Wis.

MOTORISTS' PURCHASING ASSOCIATION.

A charter has been granted in New York state to the Motorists' Purchasing Association, Inc., Canandaigua, N. Y., with $5000 capitalization. The incorporators are E. H. and G. L. Boyce and W. J. Hawley, Canandaigua.

BIG AUTOMOBILE EXPORT BUSINESS IS EXPECTED.

Judging from many reports heard at the New York automobile show, the American automobile export business will be very large within the next few years. Representatives of motor car and accessories dealers in India and Arabia attended the show and they made contracts for large shipments of cars and parts to those countries.

Charles E. Miller, who deals in nearly every accessory for motor car use ever made or heard of, said that in the first four days of the New York passenger car show he had contracted for more business here and abroad than he had ever done in the entire week of former exhibits.

The exhibitor of a motor drill press was visited by a Glasgow merchant, who left an order for an early shipment.

WOULD MAKE OWNERS LIABLE FOR DRIVERS' ACCIDENTS.

A New York Legislature bill would amend the highway law by adding a section making the owner of a motor vehicle or of any interest therein liable in damages for injuries to person or property due to the negligent operation of such motor vehicle by any person having such owner's authority, consent or direction, express or implied, direct or indirect, to operate such motor vehicle at all times or at intervals for any purpose whatsoever. Such authority, consent or direction shall be presumed to exist if shown to exist prior to such act of negligence, unless revocation thereof be established.

WOULD OPEN NEW YORK SPEEDWAY TO AUTO TRAFFIC.

A bill now pending in the New York Legislature would open the New York City Speedway to automobile traffic. The measure would amend the law that now limits the use of the speedway to light carriages drawn by horses. Trucks, carts and vehicles of all kinds for the transportation of merchandise or freight of any description would be excluded from the course in the discretion of the park commissioner.

YEAR'S SPEED ARRESTS IN NEW YORK CITY.

According to records in the office of the secretary of state in New York a total of 5266 persons were arrested for speeding in New York City between Jan. 1 and Nov. 1, 1918. The fines aggregating from motor vehicle violations in the metropolis represented $147,671. In default of fines 171 persons were committed.

WOODARD IS REPUBLIC VICE PRESIDENT.

The board of directors of the Republic Rubber Corporation, Youngstown, O., and the Republic Rubber Co., has elected H. J. Woodard as vice president in charge of sales and Mark W. Roe as vice president in charge of plant.

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Market Will Absorb All the Trucks Produced

"There is a ready market today for millions of trucks in this country," declared C. R. Dunbar, president of the Clyde Cars Co., manufacturer of Clydesdale trucks, when asked his opinion of what post-war conditions would be. Mr. Dunbar, besides being president of the company, distributes Clydesdale trucks in Massachusetts and surrounding territory. He said there was no fear that the market would be glutted.

"I am a great deal more afraid," said Mr. Dunbar, "that our factory won't be able to produce enough to supply the demand than that it will produce more than can be sold. I have been in the automobile business for a good many years and have had a chance to watch the development of the motor truck industry almost since the beginning. To my mind it has never been a question of the size of the market for motor trucks nor the probable number of purchasers.

"The sale of motor trucks has been limited by the ability of the motor truck sales organizations to prove to each individual buyer that motor trucks would actually effect an economy in his delivery department. And up to within two or three years ago this had not been an easy matter. In many lines of business it could not be done at all. In other lines the margin of profit shown by motor trucks was so small as to leave room for doubt in the purchaser's mind.

"The reason for this was because the motor truck was in a period of evolution. Its life was short, its upkeep high. During the war, however, this situation has been entirely changed. In the first place the motor truck has developed more rapidly during the past four years than it did in the previous 10. The exacting requirements of military service made it absolutely necessary to produce trucks stronger, longer lived and more durable than had ever been dreamed of before. And they did stand up.

"Military use proved to the world that the motor truck is without a rival as an economical means of transportation for all short hauls and even for long cross-country hauling. The public has become convinced of this. Business houses today recognize that they have got to come to motor truck haulage if they are going to be able to compete successfully. Today the motor truck salesman can absolutely prove to practically every business house in every business line that motor trucks will affect a big saving. The longer life and lower upkeep of practically all the leading makes of trucks removes all question of doubt regarding these savings.

"We are impressing on every Clydesdale dealer and salesman that the market for motor trucks is practically unlimited; that with few exceptions every business house of any size in his territory will buy motor trucks eventually; that his business this year is entirely dependent upon how fast he gets around to these business houses and proves to them exactly what motor trucks will do for them today.

"And that furthermore he now has a mass of evidence that will prove this to them without a question of a doubt, if presented properly, evidence in the shape of the records motor trucks made in military service, records which motor trucks have made in cross-country hauling, records which motor trucks are making in the service of thousands of the largest concerns in the country.

"With such proof as this to offer and with a good dependable truck to back it up, no dealer need worry over an over production of trucks. His business will entirely depend upon his own energy and initiative."

HYPHENATED MOTOR NUMERALS POPULAR.

The hyphenated effect in automobile plates devised by Secretary of State Hugo of New York some two or three years ago, has apparently scored a hit with other states, for this year Connecticut, Maine, Maryland, North Carolina, South Carolina and the District of Columbia appear on the scene with hyphenated plates.

Traffic policemen and others say that the idea is an admirable one, enabling them to catch more easily and accurately the numbers of passing cars. Secretary Hugo has received letters from several states serving to indicate that the hyphenated plate will prevail within the next year or two.

WELLMAN-SEAVER-MORGAN CO. TO ERECT ADDITION.

The Wellman-Seaver-Morgan Co., Cleveland and Akron, O., manufacturer of rubber machinery and general mechanical equipment, has awarded the contract for the erection of a four-story addition to its factory and office buildings in Akron. The addition will be 28 by 68 feet and will cost $80,000.

The Bedford Park Garage, Inc., the Bronx, New York City, has increased its capital from $600 to $15,000.

Pneumatic Tires in Test Show Big Economies

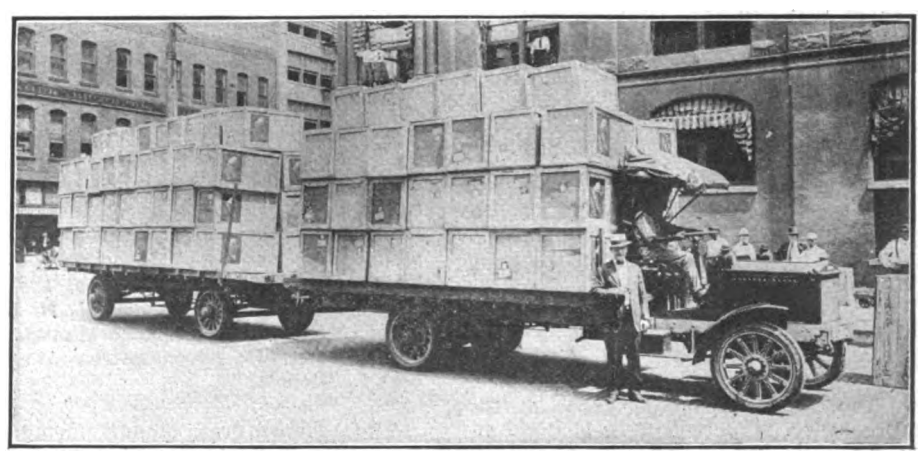
A comparative test to ascertain the relative merits of pneumatic and solid tires on trucks has just been completed by the Ohio Furniture Co., Cleveland, O. Two trucks, identical in make and size, one equipped with pneumatics in front and solids in rear, and the other equipped all around with pneumatics, were used in the test, which covered six months. At the end of the test period the all-pneumatic truck had traveled 6000 miles, or 25 per cent. farther than the other, which had gone 4800 miles.

The report of the test states that repairs on the pneumatic tired truck amounted to $63.09, while the repairs on the truck with solid tires cost $129.55, a saving of $66.46 for the truck with pneumatics. A still greater proposition of saving is shown in the gasoline record, the solid tired truck using 1812 gallons in 4800 miles, whereas the pneumatic tired truck used 1320 gallons while running 6000 miles. This represented a difference of $197.47 at the prevailing rate.

The record adds to the credit of the pneumatics the sum of $55.18, representing a saving in oil, the truck on solids using 504 quarts of oil, or 144 more than the other truck. The company's books show that the driver of the truck on pneumatics saved his employer $161.50 in wages in traversing 25 per cent. more ground than the other truck in the same period.

For depreciation one cent was charged off for every mile run on the pneumatic tires, and three cents per mile on the other, a margin of $84 in favor of the pneumatics. The test showed that the Goodyear pneumatic tires used paid for themselves and yielded a profit of $264.61.

C. L. Fox has returned from the officers' training school at Jacksonville, Fla., to become assistant sales manager of the Saxon Motor Corporation, Detroit. He was training in the Motor Transport Corps.



Handling Bulky Loads Is Best Done with a Truck Used as a Tractor, with a Full Trailer, for Each Unit Can Be Utilized Separately Whenever Occasion Requires, and Both Have Full Economic Value.

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HOLMES FOUNDRY CO. TAKES OVER ROMEO CO.

Following the reorganization of the Romeo Foundry Co., the Holmes Foundry Co., Port Huron, Mich., has been incorporated with capital stock of $1,250,000. The officers are: President, L. A. Holmes; vice president and general manager, L. G. Blunt; secretary-treasurer, C. C. Peck; general superintendent, William F. Hooper.

The reorganized company is closely associated with the Holmes Foundry Co., Ltd., Sarnia, Canada, of which Mr. Holmes is the head. The company will continue to supply castings and other foundry products required by the General Motors Co. and its subsidiaries.

RAYMOND DROWN KILLED BY TANK MINE.

Raymond Drown, son of John W. Drown, advertising manager of the Standard Roller Bearing Co., Philadelphia, Pa., was killed in France after the signing of the armistice, while engaged as a member of the Engineering Corps in removing mines laid by the German to trap tanks. He was a corporal.

CONSOLIDATED AMERICAN INDUSTRIES.

A charter for the Consolidated American Industries, Inc., organized to manufacture and sell automobiles and automobile accessories, has been filed in Delaware by G. L. Peroclieu, Richard O. Smith and Frank C. Mulliner, all of New York. The capital is $500,000.

FARMERS BUY SEDAN CARS.

A census made by the manager of an automobile factory making a popular car revealed that out of 1643 owners, 331 were farmers and ranchmen, and that the demand for closed cars was increasing among the farmers, many of the recent sales being Sedan cars.

JAPAN HAS 4000 AUTOMOBILES.

There are 4000 automobiles in Japan, according to Y. Bryan Yamashita, a banker of that country. The population is 45,000,000. The small number of machines is attributed to the fact that the country has no good roads.

QUALITY TIRE GETS FACTORY.

A factory with 57,000 feet of floor space has been acquired by the Quality Tire and Rubber Co., Anderson, Ind., and it is planned to equip the plant for the manufacture of tires and tubes.

NEW BRUNSWICK, N. J., FIRST AUTO SHOW.

The first automobile show at New Brunswick, N. J., will be held there during the week of March 8 to 15. It will be held in the Armory and about 40 makes of cars will be shown.

Bay State Dealers to Fight a Higher Truck Tax

Motor truck owners and dealers in trucks and cars throughout Massachusetts have begun a fight against some of the provisions recommended to the Legislature by the joint committee appointed to investigate motor matters. Larger fees are urged by the committee.

Truck owners now pay $5 for one ton and $3 for each additional ton. The new fees provide:

1	ton	$15
1½	tons	30
2	tons	40
2½	tons	50
3	tons	75
4	tons	100
4½	tons	150
5	tons	200

For every additional ton there would be a fee of $200. Motor vehicle owners would have to pay the fees.

The committee proposes a division of motor dealers into three classes: Those who sell machines, new and used; those who deal in used cars solely, and those who buy cars for junk. All would have to take out licenses in the city or town where they do business, and a fee for this might be as high as $100.

The dealers would have to report every day to the Highway Commission every car or parts of machines taken in trade or bought. Those licensed under classes two and three would be compelled to hold their cars at least four days before reselling unless given special permission.

Dealers are now allowed several license plates for their cars and these are registered at a lower price than those in use all the time by owners. The report recommends that cars of dealers pay the same fees as that of the owners.

The weight of the load in tons is restricted to six tons and the length over all of trucks and trailers 26½ feet, height 11 feet and width 92 inches. Jitneys would be limited to their carrying capacity for seats, except that children under seven years could be carried in adults' laps.

An attempt was made last year to increase the fees so that they would be a flat $10 a ton, but this was defeated.

NEW BEARING PLANT AT OWOSSO.

Bronze babbitt-lined bearings for automobiles, auto trucks and electrical motors will be manufactured by the Owosso Bronze Bearings Co., Owosso, Mich., which has completed its organization. The company is incorporated at $25,000. The officers are: President, J. H. Robbins; vice president and general manager, James Van Pelt; secretary-treasurer, Albert L. Nichols.

The Advance Brass Manufacturing Co., Muskegon, Mich., has appointed Oscar P. Berg manager. He was for eight years register of deeds of Muskegon county.

AKERS PROPOSES STATE RURAL EXPRESS COMMISSIONS.

A study of the rural express lines problem has convinced F. H. Akers, sales manager of the Reo Motor Car Co., that a rural express commission operating under state laws may eventually have to be created in each state to control the situation. Tariffs, he says, will have to be established and there must be better protected roads.

Mr. Akers believes that it is the greatest system of transportation ever devised, and that, as such, it should be protected from its pit falls.

"It is like any other expedient designed to meet an emergency," says Mr. Akers, "there are, apparently, some wrinkles that must be ironed out before the system will operate entirely successfully.

"Not long ago one of our truck dealers in Washington saw a very feasible untraversed motor express route between a small town and a fairly good sized city. A young clerk in a clothing store had consistently saved his money—had been reading the government's propaganda—and saw in the rural express idea an opportunity of becoming his own boss—a proprietor of a rural express line—with every chance to expand. The young man enlisted the help of the truck dealer. Together they canvassed the merchants in the town and were assured of enough business to make the line pay, providing a reasonable amount of freight could be secured in the city to haul back.

"The young man purchased the truck and soon had a thriving little business. Then another truck dealer got busy and persuaded another man to enter the business. Competitor No. 1. A truck dealer in the city at the other end of the line induced a man there to inaugurate a line on the same route. Competitor No. 2. Shortly there were four competitors on the one line and when the business was split four ways there was not enough money left to pay gasoline bills.

"Had a properly constituted commission been established with the necessary authority to grant franchises and limited the route to two competitors the enterprise would have been a success. With the franchise there would naturally go some undertakings on the part of the truck owner. For example, he would have to give a bond to deliver on schedule the same as the parcel post contractor in any city, with a penalty attached for failure. Rates would be established by this commission. A truck owner should not be compelled to make rates so low that he can't give good service or yet, because of his franchise, be allowed to charge exorbitant rates.

"The return loads bureau, which is another factor in conducting the rural express system, is something else that will need careful attention. The evil of all loads being return loads, will be a menace to the rural express system unless carefully guarded against."

Harry W. Perry has taken charge of the Washington bureau of the National Automobile Chamber of Commerce.

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Personal News of the Industry in Brief.

D. G. Caywood has joined the sales force of the Black & Decker Manufacturing Co., Baltimore, Md., in the capacity of special representative to carry on the field work in the distribution of the Black & Decker specialized products. For



D. G. Caywood, Special Representative for Black and Decker Manufacturing Co.

the last 15 years Mr. Caywood has been actively engaged in this field. He was formerly sales manager of the Brunner Manufacturing Co., Utica, N. Y.

B. F. Wuiff, formerly sales manager for the Century-Plainfield Tire Co., has been appointed general sales manager for the International India Rubber Corporation, South Bend, Ind.

Thomas L. Moore is now southwestern district manager for the General Tire Rubber Co., Akron, O. He will be located at Dallas, Tex.

C. P. Brewer has returned to the United States after having spent nine months as a Y. M. C. A. secretary in England, France and Italy. He will make an extensive tour through the Detroit and Indianapolis factories. Mr. Brewer is associated with the Brewer Motor Car Co., Spokane, Wash.

Major Howard Blood, a member of the Blood Brothers Machine Co. of Allegan, Mich., has been transferred from Dayton to Detroit, and is now connected with the finance division. He was formerly executive officer of the Aeroplane Engineering Division.

C. L. Holt is now manager of the tire and accessory department for William L. Tedford, distributor of Federal tires for Arkansas. He was formerly auditor for the Kansas Democrat, Little Rock, Ark.

L. M. Baker has become associated as special sales engineer for the Hyatt Roller Bearing Co., Detroit. He has been sales manager of the United Motors Service, Inc., and previous to that western sales manager for the Standard Steel Spring Co., Detroit.

H. T. Melhuish will take charge of the office in Philadelphia of the Fulton Motor Truck Co., Farmingdale, L. I. He will have charge of advertising. Mr. Melhuish succeeds M. R. Sanborne, who goes to the Kansas City office.

Fred E. Dean is now western manager of the Allied Metal Sales Corporation, New York. His headquarters will be in the Dime Bank building, Detroit.

J. B. Siegfried has been appointed sales manager and assistant general manager of the Auto Wheel Co., Lansing, Mich. He was formerly general manager of the King Motor Car Co., Detroit.

Lieut. W. H. Harley has become assistant manager of the Motor Truck Sales Co., Arkansas distributor for G. M. C. trucks and trailers, Indiana trucks and Fruehauf trailers. He has been connected in the United States air service.

J. E. Murph has joined the Fulton Co., Milwaukee, as traveling representative for 11 southeastern states. He was formerly manager of the tire and accessories department for William L. Tedford, Arkansas distributor for Federal tires.

Gilbert U. Radoye is now advertising and assistant sales manager of the Haynes Automobile Co., Kokomo, Ind. He was formerly affiliated with the advertising division of the Hudson Motor Car Co., the Packard Motor Car Co. and with the Nordyke & Marmon Co.

Glen T. Purdy has become assistant purchasing agent of the King Motor Car Co., Detroit. He has just returned from active service.

Joseph P. Ripley has been promoted to central district manager of the Fisk Rubber Co., Chicopee Falls, Mass. The central district is one of the largest in



Joseph P. Ripley, Central District Manager Fisk Rubber Co.

the sales organization of the Fisk company, including 20 direct branches. His headquarters will be in Chicago. Mr. Ripley succeeds Claude Platt, who has been appointed special representative.

Claude Platt has been promoted to special representative of the Fisk Rubber Co. of the central district, which includes Illinois, Indiana, Wisconsin, Iowa and a part of Kentucky. His new duties will take him among the manufacturers



Claude Platt, Special Representative for Fisk Rubber Co.

of the country handling special and contract sales in pneumatics and solids. Mr. Platt has been identified with the rubber business since its earliest days, having been with the India Rubber Co. His headquarters will be at the offices of the Chicago main branch, 2508 South Michigan boulevard.

C. B. Caruthers has become associated with the Denby Motor Truck Co., Detroit, as district manager for Indiana and Kentucky. He has been connected with the industry for several years, having been engineer of the Hupp-Yates Co. and experimental engineer for John Lansden. Of late years he has been associated with the Canadian branch in the selling end.

K. K. Hoagg is now engineer in the sales department of the Hyatt Roller Bearing Co., Detroit.

Arlington Bomunk has joined the service department of the Cook Auto Co., Little Rock, Chevrolet dealers. For several years he was connected with the Chevrolet factory.

Homer Blocker has been promoted to the position of advertising manager of the Republic Rubber Corporation. For the last two years he has been assistant to the advertising manager.

Lieut. Ezra W. Clark, who has been discharged from the air service, has become advertising manager for the Clark Equipment Co., Buchanan, Mich.

Major N. B. Morgan is now chief engineer of the Cleveland Tractor Co., Cleveland. For 14 years he has been engaged in automobile engineering. In June, 1917, he was appointed assistant to the chief of the Ordnance Department of the Army.

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E. G. Liepold, who has been secretary to Henry Ford for many years, will continue in that capacity and will be hereafter located at the Dearborn plant, where he will become a supervisor at the tractor plant.

J. R. George, who was formerly connected with the F. S. Carr Co., Boston, makers of automobile fabrics, has become assistant sales manager of the Barley Motor Car Co., Kalamazoo, Mich.

D. F. Edwards has resumed his work at the plant of the Pressed Steel Co. of Lansing, Mich. He is treasurer of the company. Mr. Edwards held the rank of major in the purchasing and supply division at Washington.

J. J. Sullivan has assumed the duties of manager of the used car department of the Reo Motor Car Co. of New York, Inc., in Brooklyn. He was formerly connected with the Studebaker Corporation of America in New York.

R. Martinez Fernandez has entered business for himself as tire representative. He was formerly connected with the Carrisle Cord Tire Co., New York and central district manager.

F. R. Strunk is now works manager and treasurer of the Coleman Tractor Corporation. He was formerly president of the Kansas City Foundry Co.

Horace Slingluff, Jr., has joined the sales force of the United Auto Sales Co., Studebaker and Garford distributors, Baltimore. He was the first manager of the Mid-City Garage, Baltimore.

Justin R. Weddell, Cleveland, O., has taken the position of E. S. Babcock, who has resigned as advertising manager of the Firestone Tire Co., Akron, O. Mr. Weddell comes from the Corday & Cross Co., where he is present sales manager.

L. A. Sommer has resigned as factory manager of the Allen Motor Co., Fostoria, O., to become head of the Sommer-Adams Co. of Cleveland. This company has just been incorporated to manufacture special jigs, tools and fixtures, concentrating on automobile and parts work.

W. B. Jewell is now manager of sales for the Sweeten-Wilmington Co., Wilmington, Del., agents for the Franklin. Mr. Jewell was formerly with the Foss-Hughes Co. and later with the Ordnance Department of the Bethlehem Loading Co. at New Castle, Del.

E. Ketchum has joined the Reinhard Motor Co., Oakland and Jordan distributors, Baltimore.

Major Lewis P. Kalb has joined the engineering staff of the Standard Parts Co. as assistant to J. G. Utz, director of engineering. He was formerly in the engineering division of the Motor Transport Corps. Before entering the service Major Kalb was chief engineer of the Kelly-Springfield Motor Truck Co. and previous to that was assistant truck engineer of the Pierce-Arrow.

William Tully Norton, Jr., has been appointed chief engineer for the Russel Motor Axle Co., Detroit, Mich. He was formerly in charge of the executive branch, engineering division, Motor Transport Corps. Previous to entering the service he was experimental engineer for the Selden Motor Vehicle Co., Rochester, N. Y.

Charles M. Jessup has assumed the duties of assistant to O. F. Conklin, president of the Remy Electric Co., Detroit, Mich. He was for the last four years director of the commercial interests of the motor equipment division of the company. In his new duties he will have full supervision of sales of the motor equipment division.

H. L. Browne is now factory representative for the Acme Motor Truck Co. in Colorado, Wyoming, New Mexico and Utah. For several years he was with the Service Motor Car Co. J. E. Bowles will be transferred to the Pacific coast. For the last year he has been a special representative in the middle western states. His headquarters will be at San Francisco, Cal. George P. Gould is to be factory representative in Massachusetts, Maine, New Hampshire and Vermont.

Ray A. Long is back with the Columbia Motors Co., Detroit, Mich., as chief engineer. When the United States entered the war Mr. Long entered government service and was appointed one of the staff of engineers to develop the Militor four-wheel drive truck.

Sam V. Ward has been appointed manager of the truck department of the Kardell Motor Car Co., St. Louis, Mo.

Dan Hyland has taken the agency for the Stewart-Warner Speedometer Corporation in St. Louis and will conduct it as the official service station.

Fred R. Bump has resigned as manager of the New York branch and the eastern district for the Studebaker Corporation to join the Cleveland Tractor Co. His headquarters will be at 1790 Broadway, New York City. For over four years Mr. Bump has been with the Studebaker concern.

C. O. Dail is now special representative for the Stewart-Warner Speedometer Corporation, Chicago. He will have his headquarters at Cleveland, covering a large part of the territory adjacent to the Forest City. He was formerly with the Splitdorf Electrical Co., Newark, N. J.

Ira C. Jones has been appointed general manager of the Studebaker branch in New York City, succeeding Fred R. Bump, who has resigned. Associated with Mr. Jones as retail sales manager is Frank Scholes. The headquarters will be at Broad and 56th street.

Lieut. J. Bertram Howell has returned from artillery service, U. S. Army, and is now in the sales department of the Bound Brook Oil-Less Bearing Co., Bound Brook, N. J.

Paul Hale Bruske has rejoined the staff of the Power, Alexander & Jenkins Co., Detroit, advertising agency. Mr. Bruske wrote the successful advertising for James Cousins. Among other accounts in the agency he will have charge of the advertising for the Harroun Motor Corporation.

C. D. Studebaker has assumed the duties of district manager for the Firestone Tire and Rubber Co.'s branch, New York City. F. P. Jones, formerly manager of the Newark branch, succeeds Mr. Studebaker in the management of the New York office.

Merle MacFarland, for a number of years in the parts business, is now with the sales department of the Truflex Safety Glass Corporation, New York, manufacturers of non-breakable glass.

O. L. Travis, for several years identified in tire selling, has been appointed sales manager of the Owen Tire and Rubber Co., Bedford, O., manufacturers of truck tires. Mr. Travis has traveled the entire country in this work, developing a wide acquaintance with dealers.

Glen L. Orr has resigned as purchasing agent of the Briscoe Motor Corporation, Jackson, Mich., and has become secretary of the M. H. Herrmann interests, Detroit.

Joseph Hubner has been elected president of the Pan-American Rubber Co., Milwaukee, Wis., at the annual meeting of the stockholders. Other officers elected include the following: Charles Christian, treasurer, and P. H. Preston, secretary. A dividend of seven per cent. has been declared on the preferred stock.

G. B. Rickenbaugh has been elected vice president of the Scott Corporation, Aeolian hall, New York City. The company deals extensively in automobile accessories in both domestic and foreign fields. It has general offices in Paris and London. Mr. Rickenbaugh has been identified with prominent banking interests in Pennsylvania.

P. G. Greene has resigned from the Motor Car Equipment Co. of Boston to become associate manager of the Automobile Equipment Department of the more-Savage Co., Boston, Mass.

L. P. Prossen has become associated with the Nilson-Miller Co. of Hoboken, N. J. He has been elected vice president and will be in charge of the gear cutting and piston ring departments. Mr. Prossen was formerly mechanical superintendent of the Black & White Taxicab Co., New York City.

S. Ash has been appointed business manager of the L. V. Flechter & Co., New York carburetor manufacturers. He will have charge of the factory offices. For the past year Mr. Asch has been acting as assistant to the secretary.

Benton G. L. Dodge has resigned as advertising manager of the McNaull Tire Co., Toledo, O. Prior to entering the McNaull organization Mr. Dodge was for a long time associated with the Standard Parts Co. in advertising work.

N. G. Rost, general sales manager of the Deusenberg Motors Corporation, has returned from Europe. He was there on a visit in the interests of the company. The company is located at the old quarters, 120 Broadway, New York City.

W. T. Horton, Jr., who was formerly in charge of the executive branch of the engineering division, Motor Transport Corps, has been appointed chief engineer of the Russel Motor Axle Co., North Detroit.

C. A. Watson has assumed the position of sales manager of the Four-Drive Tractor Co., Big Rapids, Mich. Mr. Watson was formerly a distributor of the Studebaker car.

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A New Device for Ford Cars

HEADLIGHT EQUALIZER



THIS little device is inserted in the lamp socket of the right hand headlight, is locked into place by the knurled locking nut, and the lamp plug is then inserted into the open end of the Equalizer.

The following results are obtained:
Much brighter lights.
Uniform light at all speeds.
Bright lights at low speed.
Protection for the bulbs.

If one bulb burns out, the other remains burning.

Ford owners have always been bothered with poor lights at low engine speeds. This device corrects all this. No electrical or mechanical knowledge required for attaching, and the cost is insignificant.

List Price 75 cents each, subject to our regular trade discounts.

Culver-Stearns Manufacturing Company

WORCESTER, MASS. DETROIT, MICHIGAN

Distributed by

J. H. Faw, Inc., 37 Warren St., New York, N. Y. Manuel Bergman, 1777 Broadway, New York, N. Y.
M. A. Bryte, Inc., 543 Golden Gate Ave., San Francisco, Cal.; 2208 South Michigan Ave., Chicago, Illinois.



EQUIPMENT FOR BATTERY SERVICE STATION.

(T. E., Jr., Lynn, Mass.)

Please send me information regarding equipment, apparatus, tools, etc., used in connection with storage battery work.

In the absence of specific requirements we assume that you desire information as to what equipment is necessary for operating a battery service station. Much depends upon the size of the station. Assuming that you mean doing work of any kind, charging, restoring inefficient batteries, etc., used for vehicle propulsion, starting and lighting, you would need whatever might be utilized in any service station, but possibly not as much equipment of any one kind.

The building should be preferably of stone, brick or concrete, and the floor should be tiled or concrete. A wooden floor, thoroughly cleaned and saturated with hot asphaltum paint might serve, but it will not be satisfactory. The structure should be well lighted.

Six things are absolutely necessary: Work benches with vise, lead burning outfit, sink with water supply, charging bench and equipment, shelving for storing boxes, plates, jars, tools, lead, etc., and stove for heating sealing compound. There must be a desk at least, and means for keeping records of the business.

The tools and equipment needed are generally recommended and are sold by the large battery manufacturers, the Electric Storage Battery Co., Philadelphia, Pa.; the U. S. Light and Heat Corp., Niagara Falls, N. Y.; Philadelphia Storage Battery Co., Philadelphia, Pa.; Willard Storage Battery Co., Cleveland, O., and the Prest-O-Lite Co., Indianapolis, Ind. These concerns will submit lists of tools and equipment that may be desirable or necessary. They will also furnish supplies of all kinds.

Obviously, an enumeration such as you have requested would include several hundred items. Not only this, there is considerable shop equipment that must be built to meet the particular conditions of use.

Very practical information is obtainable in the book "The Automobile Storage Battery," published by the American Bureau of Engineering, Inc., 1018-24 South Wabash avenue, Chicago, Ill., which deals very largely with repairing. The price of this book is $5 and it is well worth it.

There are other publications, in fact many of them, which deal with lead-acid secondary batteries. These, however, treat of theory and practise and not with battery repair and maintenance.

Many of the battery manufacturers publish very interesting literature. This information is obtainable generally at request and is extremely valuable. All depends, however, upon the use made of it. As a rule what is published relates to battery maintenance by owners and seldom takes up repairing.

REMOVING SEDIMENT FROM LEAD-ACID BATTERY.

(B. B., Oakfield, N. Y.)

I have an Exide battery. Can you tell me how to take it apart to get sediment out of the bottom of the cells; also, is it best to store the parts of the battery during the winter and add liquid when you are ready to use them in the spring?

The following information is supplied by the Electric Storage Battery Co., relative to the care of Exide batteries:

Sediment and Its Removal—As the battery is used a de-

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YOU CAN MAKE BIG PROFITS

Charging Auto Storage Batteries

HB

In the winter months, heavy starter service when the engine is cold and excessive use of lights on account of shorter days, quickly drain the automobile storage battery and bring big profits in battery charging. The very thing that makes business run low in other lines makes battery charging run highest. Hundreds of owners of HB Charging Equipment are clearing

$150 to $200 a Month

Extra Profit

Some even more. What you can make depends entirely upon yourself. If you go into this business right and push it hard so as to need large capacity to charge the batteries that will be brought to you, we recommend this new 32 Battery Capacity Charger. It contains an amply designed 5 H. P. Motor, operating from city current and developing 2 K. W. Generator capacity. It will charge 32 6-volt batteries or their equivalent at one time. Four separate charging lines and panels permit individual attention to every battery. It is a real money maker, which, with convenient terms of payment offered,

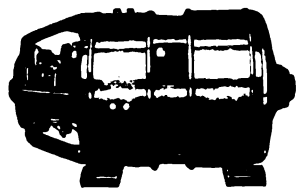
with this 32 Battery Capacity Charger

Will Easily Pay for Itself

while you use it. Under absolute money-back guarantee you run no risk. Write at once for further information, prices and terms. Start this money-making business now.

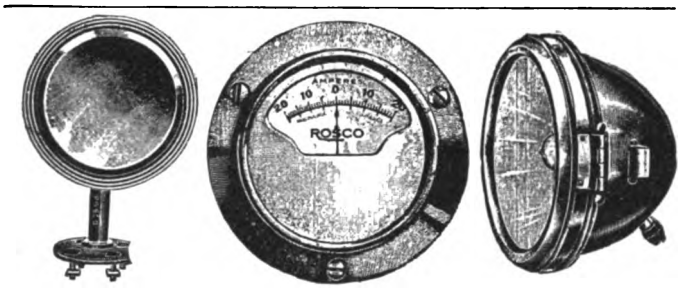


We can furnish smaller outfits, either for use on city current or with belt drive. Write for further information.



Hobart Brothers Co.

Box C2 **Troy, Ohio**









Our Line is a Money-Maker for you—Stock Now—Immediate shipments.

Write for

CATALOG

illustrating our Complete Line with Prices

It Will Pay You



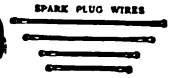












A. W. ROSEN & CO.

MANUFACTURERS

610-614 Broadway **New York**

posit (sediment) collects in the bottoms of the jars, due to the gradual wear on the plates. Great care should be exercised to see that the sediment does not touch the bottoms of the plates, thereby short-circuitng them and doing great damage. Before this occurs the cells should be cut apart and the sediment removed. It is impossible to state definitely at what intervals the sediment should be removed, as this depends upon the work the battery does and the care it receives.

To determine when to remove the sediment, it is advisable, after the battery has been charged 50 times, to cut out for inspection one cell from the center of the battery. Then from the height of the sediment, estimate when it should be cleaned out, making the estimate safe by a sufficient margin to insure cleaning before the sediment can possibly reach the plates. The sediment should be removed when it has accumulated to one-quarter inch below the bottoms of the plates. As an example, suppose the jars have ribs in the bottom 1¾ inches high; the sediment should be cleaned out when it becomes 1½ inches deep; so, if after having been charged 50 times there is found one-half inch of sediment, then, at the same rate of deposit, cleaning should be done after the battery has received 100 additional charges, or a total of 150; but on account of the more rapid rate of deposit with age, it is necessary to make an allowance of 20 per cent., which would mean cleaning after a total of 120 charges. If after 50 charges three-quarters inch of sediment is found, then the battery should be cleaned after a total of 100, less 20 per cent., or 80 charges (30 in addition to the original 50).

When about to remove sediment, fully charge the battery; then disconnect all cells. The best method of disconnecting cells assembled with pillar straps is to use a ⅝-inch twist drill, in a carpenter's brace, boring down into the top of the pillar about one-quarter inch; then pull the connector sleeve from the pillar. By following this method all parts may be used again. When the cells are equipped with top straps the straps should be cut with a sharp knife or chisel midway between the cells. Taking each cell in turn, remove the element (plates, separators, etc.) from the jar, place it on its side with the plates vertical, slightly spread the plates apart at the bottom, withdraw the separators and play a gentle stream of water on the plates. If the negative plates need pressing (the active material extending beyond the ribs of the grid supporting it), this should be done before the plates are dry. The most suitable and convenient method for pressing is to place the plates between smooth boards of a thickness equal to the distance between the plates and then put the groups under pressure. Broken or cracked separators should be replaced with new ones; it is, however, usually advisable to install a complete new set of wood separators. The separators which are to be put back into the cells should first be cleaned. Pour the electrolyte into an extra jar or other suitable vessel; in order that it may be used again care should be taken not to stir up the sediment. Remove the sediment from the jar, rinsing it thoroughly; then immediately replace the element in the jar, covering it with electrolyte so that it may not be exposed to the air any longer than is absolutely necessary, as the plates should not be allowed to dry. If the old wood separators are used again, fill the jar with electrolyte of the same specific gravity as that previously in the cells. If, however, the new wood separators have been put in, the gravity of the electrolyte used for refilling should be 40 points (.040 specific gravity) higher than when the cell was taken apart, to counteract the lowering of the gravity by the water in the separators.

The next step is to replace the hard rubber covers. Place the cells in the trays and after making sure that the polarities are correct (the positive strap of one cell must connect with the negative strap of the adjoining cell) reburn the connections and if the cells are to be sealed, apply the sealing compound. The sealing compound should be placed in a vessel of very hot water until it is soft enough to be worked with the hands, and before applying it, care should be taken to dry thoroughly both jar and cover with a piece of cloth or waste. The compound should be applied at the junction of the jar and cover with a piece of cloth or waste. The compound should be applied at the junction of the jar and cover; it need not be spread all over the cover. The battery should then be fully charged and the electrolyte adjusted to the proper specific gravity. On this charge all the precautions

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necessary in regard to charging connections and the initial charge must be taken. After the work is completed take a discharge, followed promptly with a full charge, to make sure that all the cells are in good condition.

While the battery is dismantled the trays should be thoroughly washed with a saturated solution of ordinary bicarbonate of soda (baking soda) in water, in order to neutralize any acid on the wood; then rinse thoroughly with water and when dry repaint with acid resisting paint. After cleaning the battery the capacity may not be as great as it was until after the battery has been charged and discharged several times.

Where a battery is to be out of service for several months and it is not convenient to give it the freshening charge every two weeks, it should be taken out of commission. To do this, proceed as follows: Charge the battery in the usual manner, continuing it at the "finishing" rate until the specific gravity of the electrolyte of every cell in the battery has stopped rising over a period of one hour (if there are any low cells, due to short circuits or other cause, they should be put in condition before the charge is started, so that they receive the full benefit of it). Disconnect the cells (as stated above), remove the covers (if sealed loosen the compound with a hot putty knife), remove the elements from the jars, place them on their sides with the plates vertical, spread the plates slightly apart at the bottoms, withdraw the separators and pull the positive and negative groups apart. Play a gentle stream of water on them, to wash off the electrolyte, and then allow them to drain and dry. If necessary the plates should be pressed as described. The positive plates when dry are ready to put away. If the negatives, in drying, become hot enough to steam they should be again rinsed or sprinkled with clean water and then allowed to dry thoroughly. When dry, completely immerse the negative plates in electrolyte (of about 1.275 specific gravity), and allow them to soak for three or four hours. The jars may be used for this purpose. After rinsing and drying they are ready to be put away. The rubber separators should be rinsed in water. Wood separators, after having been in service, will not stand much handling and had better be thrown away. If it is thought worth while to keep them, they must be kept immersed in water or weak electrolyte, and in reassembling the electrolyte must be put into the cells immediately, as wet wood separators must not stand exposed to the air for an unnecessary moment, especially when in contact with plates. When putting the battery into commission it should be treated in the same manner as if it were new and the regular instructions for assembling and putting a new battery into commission must be followed.

REPLACING WORN CHEVROLET FLYWHEEL.

(A. H., Jr., New York City.)

My car is a Baby Grand Chevrolet, 1915, and as some of the teeth in the flywheel are worn smooth I am going to put in a new flywheel. Can you give me the necessary information for taking off the old flywheel and putting on the new? Should the clutch hub fit tight? In other words, should the clutch collar have a little play. There is a set screw at either side to make adjustment. The use of these suggests the question.

The rear end of the chassis should be securely jacked and the springs and brake rods disconnected, the former at the rear axle and the latter at the pedals. The torsion tube and the universal joint (rear section) can then be drawn back so the clutch and transmission gearset can be taken out. In detail the following work is necessary:

Take out the floorboards and remove the wiring from the battery to the starter. Remove the three bolts holding the V brace to the engine base and the gearbox support and remove the V brace. Disconnect the brake rods from the pedals. Take out the bolts holding the clutch release shaft to the gearbox support and the clutch release cross shaft, together with the pedals. Remove the bolts on the rear clutch hub drive ring, and the four bolts holding the gear box to the gear box side arms. The shims under the gear box should be carefully taken out so they can be replaced as originally in the chassis. Remove one bolt holding the left gear box side arm (on the

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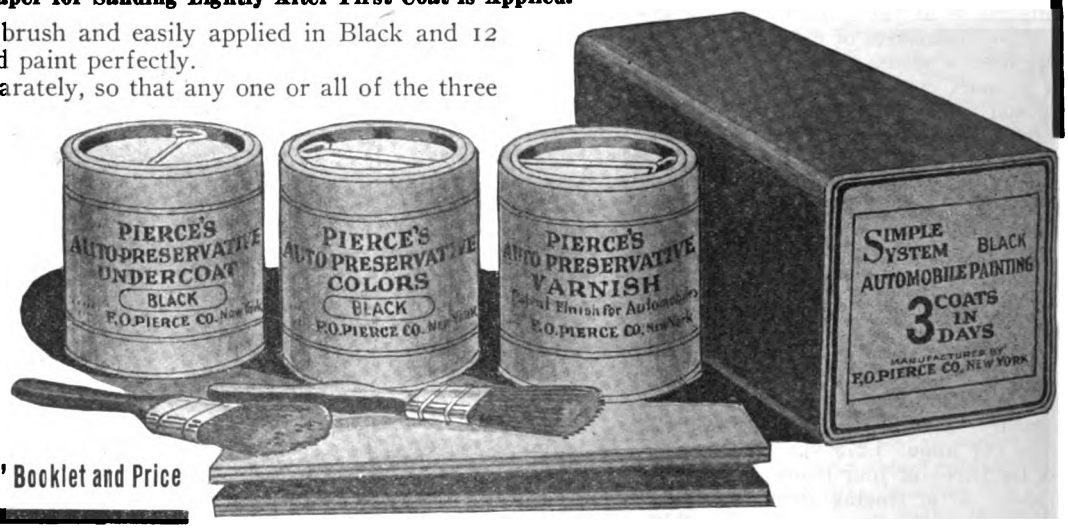
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pedal side) to the engine. With this done the gear box side arm can be sprung to one side to remove the gear box. The gear box can then be lifted and pushed forward and removed from the chassis. The propeller shaft forward end can be supported with a jack when the gear box is taken out. There is a possibility that the gear box arms must be sprung apart, or the gear box forced out with a jack. The flywheel can then be turned until the hole through the clutch hub is at the top, so that the clutch spring retaining pin is in line with the hole. The clutch spring must then be compressed. This can be done with a clamp that can be placed over the rear end of the clutch hub or release collar, with a screw through it that can be centered on the clutch spring anchor stud. The clutch spring retaining pin can then be driven out, or it will drop out of the hub when the hole is in line and the pressure released. The clutch spring can then be drawn out. The bolts retaining the clutch hub can be taken out and the clutch hub removed. The clutch can then be taken out, but as the gear box arms are pressed into the clutch considerable effort may be necessary.

The nuts holding the flywheel to the crankshaft flange should next be taken out and the flywheel loosened with a bar. The flywheel and the clutch spring anchor stud can then be taken out and placed on the bench. All these parts should then be cleaned with gasoline and waste. The balls and races of the thrust bearing should be examined and if pitted or worn these should be replaced with new. The flywheel must then be placed on its edge on a bench and the thrust bearing ball race forced into the casting. The race must seat evenly, for unless this seat is obtained the bearing will not endure the heavy duty upon it. The balls of the bearing and the clutch spring anchor stud must be assembled and packed with grease. A clamp of spring metal should be made, one end of which will retain the anchor stud in place, the other being over the edge of the flywheel. This done one can put on the retaining springs. Three old valve springs can be slipped over the forward end of the clutch spring anchor stud and the pin placed in the stud. The clamp can be removed and the stud and thrust bearing will be kept assembled.

The flywheel should then be placed on the flange of the crankshaft and all of the bolts should be drawn snugly and then all tightened as evenly as possible, for the flywheel should be in truth when the work is finished. The pin and the three old valve springs should next be taken from the clutch spring anchor stud and the clutch should be forced back into position. The clutch hub should then be bolted to the clutch, all of the bolts being drawn snugly before tightening them. The clutch spring must now be replaced and packed with grease, and with the use of the compressor the clutch spring must be compressed and the retaining pin driven in. The gear box is then replaced in the frame and the probability is that this must be sprung past the gear box side arm. The bolt holding the gear box side arm to the engine is next replaced, and the bolts of the rear clutch hub drive ring set tightly. The bolts that hold the gear box to the side arms are put in and tightened, care being taken that the shims are placed exactly as they were before removal. Next the clutch release shaft, with the clutch yoke and pedals are attached and the brake rods connected. The V brace between the gear box support and the engine is restored. The oil reservoir on the clutch yoke and the grease cups on the clutch cross shaft must be refilled and all working parts lubricated. The replacement of the wiring connections will complete the job.

The engine can then be started and if the work has been done carefully there will be no noise. If there is a rattle in the clutch drive ring the gear box is not in alignment and the shims must be changed, or perhaps removed.

RESTORING SLIPPING DODGE CAR CLUTCH.

(C. H. C. P., New London, Conn.)

Will you advise me what to do with the slipping clutch of my Dodge 1918 car? I have had it in a garage and given attention, but it still slips.

The Dodge 1918 clutch is a dry disc type, having four driving and three driven members. The driving members are faced on either side with wire woven asbestos fabric. To make adjustment of this clutch the clutch spring must be compressed

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sufficiently to move forward the split washer which fits into one of the three grooves cut on the clutch shaft, each groove being a different degree. The halves of the washer must fit into the groove securely and the rear clutch spring retainer must fit snugly around the split washer. The foot should not be placed on the clutch pedal because there is possibility of slipping the clutch and, besides, the ball bearing throwout is subjected through such slippage to excessive wear.

Oil or grease may be the cause of slippage, and for this reason the drain hole in the bottom of the housing should be kept open and the grease cup that lubricates the ball bearing clutches release should not be given more than one turn for every 50 miles driven. The grease tube should not leak. Oil on the surfaces of the plates is a very probable cause of slipping, and this can best be removed by washing with turpentine. Neither gasoline nor kerosene will penetrate the fabric. The clutch should preferably be washed with a squirt gun when it is disengaged and the throw-out bearing should be lubricated.

If what has been stated does not restore the efficiency of the clutch it should be disassembled, the asbestos fabric roughened with a stiff wire brush and the fabric soaked in turpentine. The clutch can be removed by taking off the gear box, first removing the bolts that retain the universal joint cover to the gear box. The cover can then be forced back and the universal joint itself broken. When the universal joint is assembled care should be taken to place the halves together by matching the straight or cross marks, which will be found on the circumferences of the two parts. This will obviate binding. As the clutch housing gear box and the rear engine supports are a single casting the engine must be supported by a jack and the bell housing bolts removed before the unit can be taken apart. If the special tool provided for this work is not available a piece of gas pipe about two inches diameter with one end notched to fit around the clutch adjusting nut may be used, preferably with an arbor press, a drill press or a large vise.

When the gear housing has been removed a large rag should be tightly wound around the clutch shaft and the ends firmly held, so that when the clutch adjusting nut is unscrewed the rag will cushion the clutch spring when released from tension.

In replacing the clutch spring the clutch, with the spring and nut on the shaft, should be placed in position. A piece of pipe that has a bore that will slip on the shaft had best be used, but if this is not obtainable a similar result can be obtained by slipping the shaft through the front support for the engine. If the pipe is at hand, after it has been placed on the shaft, a jack must be set between the free end and the center cross member of the frame, and by extending the jack the spring may be compressed and the adjusting nut screwed to a seat.

CLEANING CARBON FGROM OAKLAND SIX.

(F. H. K., Johnsonville, N. Y.)

Could you send me complete information for removing the head and cleaning carbon from the cylinders of my Oakland Sensible Six car, model 34, 1917; also what tools are needed?

Also, is there a means to prevent the gasoline from slopping from the vent hold of this car. If the tank is half full or more the gas slops out and runs down the side of the tank, and as the tank is not covered by the spare tire, the appearance is annoying. The cap has a cone shaped piece of metal soldered in the top to prevent the gas slopping, but it is not effective. Could the slopping be stopped by making the hole larger outside and soldering or welding in it a small tube? If so where could I get such a tube?

The engine of the Oakland Sensible Six car is a valve-in-the-head type and the head is detachable. The head is retained by a series of bolts and this can be removed with practically any wrench that will fit them. Of course the water and other connections must be broken to remove the head. After the head is removed, and with it the valves are assembled, the head can be turned upside down and supported on a bench and the carbon scraped off with a case knife, putty



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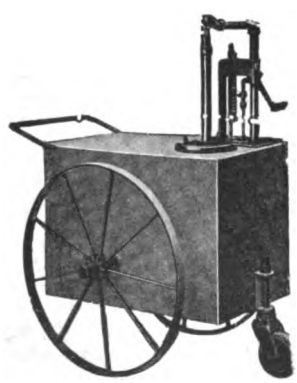
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knife, or any suitable tool. The heads of the pistons can be similarly cleaned.

When the head is off the rocker arms that operate the valves can be removed and the head turned upside down and the valves ground in as is the custom with any type of poppet valve. Removing the carbon and grinding the valves is a comparatively simple matter and does not call for especial mechanical skill.

The cause of the fuel slopping from the tank may be due to the baffle plates being loose. This seemingly could be stopped by fitting a simple ball check valve to the cap with no spring. Nothing would be gained, apparently, by making the vent larger, and such a valve as has been suggested might serve a very useful purpose.

TIMING AN E-M-F ENGINE.

(F. R., Buffalo, N. Y.)

I have a 1913 E-M-F car and have the engine down. Please advise me how to set the valves when I assemble it? Can you determine the cause for this engine choking when given more gas? The car runs smoothly up to 15 miles an hour, but in excess of this speed the engine will choke if the fuel throttle is advanced, and on a hill of not more than 100 feet the engine will die when the car has climbed about two-thirds of the grade. I have a Bosch magneto marked "MM4 ED-4T." Will you kindly tell me why the two front wires give a spark and the two rear wires no spark? Will you advise me how to regulate my new Zenith carburetor, marked L-4, which I would like to use on the car.

You can hardly make error in timing this engine. Both the flywheel and the timing gears are marked. In assembling the timing gearset the relation of the crankshaft and the camshaft gears is indicated by the marks on these gears. There is a possibility that the original gears have been replaced by unmarked gears, but this is not probable. The flywheel is marked to indicate top centers. Set the valves of the first or No. 1 cylinder to the closing of the exhaust and the opening of the intake.

The reason for the engine choking is, seemingly, too rich a mixture or too great an advance of the spark. The former condition can be changed by adjusting the carburetor; the latter by varying the spark lever. This is a matter of testing.

With reference to the magneto: That you get a spark with the two front wires in contact indicates the wiring of the magneto itself is in normal condition, you do not get electrical conductivity with the two rear wires. This may be due to a broken wire or other obstruction to the current. The cause may be determined by an examination of the circuit wiring.

Regarding the Zenith carburetor adjustment: The air adjustment is made by lightly seating the valve and then backing it until the engine will just accelerate without back firing. This applies to the car standing. For road driving there may be need of opening the gasoline adjustment just a trifle more. There are but two adjustments for a Zenith carburetor. The air is regulated by the small slow speed adjusting screws. The choke tube, the main jet and the compensator must be in correct relation as to sizes.

RESTORING SLIPPING MAXWELL GEAR CONTROL.

(W. H. B., Philadelphia, Pa.)

My 1916 Maxwell car gives me the following trouble: When in high gear a bump or the lifting of my foot from the accelerator to slacken speed causes the gear to jerk or jump to neutral. This happens every once in a while, several times in a mile. I have a new plunger spring and bolt thinking that would help it, but no improvement is noticeable.

Seemingly the defect is the condition of the slot or groove into which the plunger drops, which may have become so worn as to be V shape and does not fully engage, at least not sufficiently to lock securely. There is also the possibility that the spring is weak.

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INSTALLING AN AMMETER IN ELECTRIC SYSTEM.

(G. C., Hingham, Mass.)

Can you tell me what J. P. C., Attleboro, Mass., Page 62, Automobile Journal, December issue, wants to know, but substitute for '15 Mitchell a Dodge '17? In my issue the "Diagram of Electrical System of a '15 Mitchell Light Six" has no M on it, but has two M's. Which should be M, or where should the M Go?

J. P. C.'s query was: How can I connect an ammeter in the electrical system of my 1915 Mitchell light six so that both the charge and the discharge rate of the battery will be shown? Is the light colored wire from the dynamo the charging wire?

The reply to this was: The diagram on this page will show how the various wiring connections are made. Of the three wires from the motor generator, those marked M and D+ are used in starting, when the unit functions as a motor, and D+ and D are used for charging when the unit becomes a dynamo. It will thus be seen that the wire connecting D+ to the right hand front terminal of the starting switch (under floor boards) is the part of the circuit in which the ammeter should be connected.

Remove the end of this wire from the starting switch and connect it to one of the motor terminals, after the latter has been attached to the dash board. Provide another length of wire, having the same carrying capacity as the other and long enough to reach from the meter to the starting switch, connecting this to the second meter terminal and to the same terminal on the switch from which the other wire was removed. If, when starting, the meter reads "charge" instead of discharge, simply reverse the connections on motor.

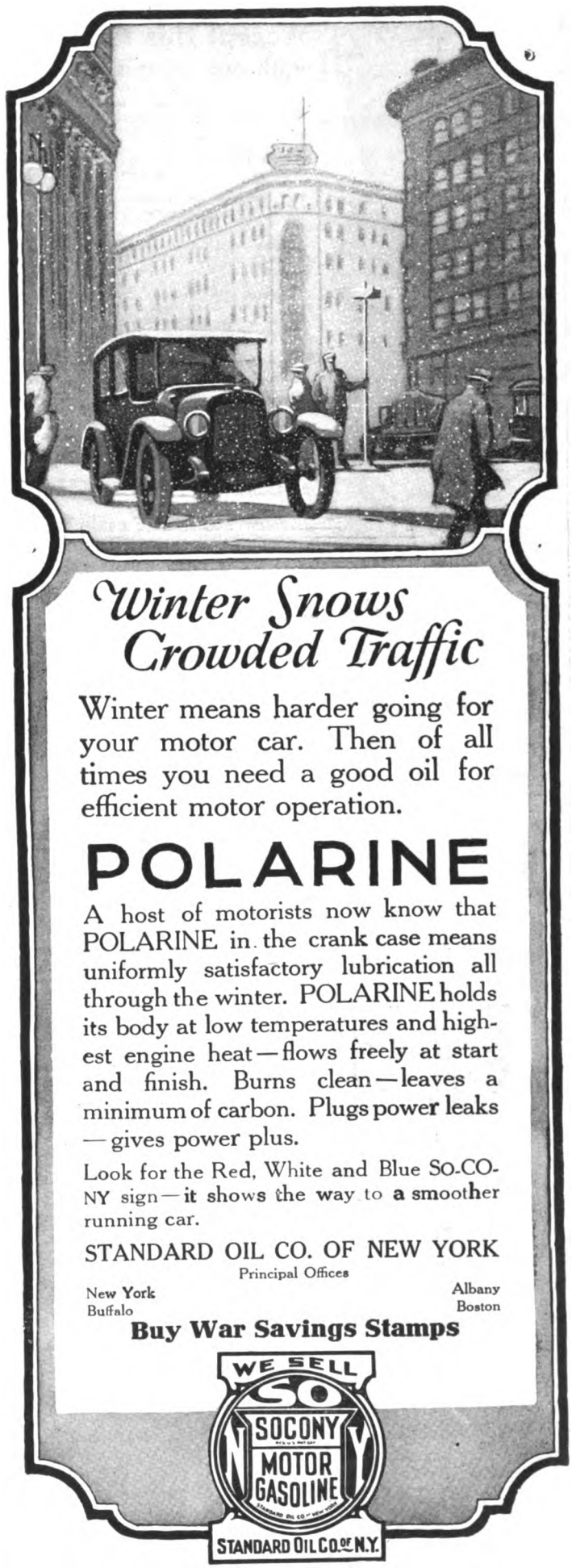
Referring to the accompanying diagram: (which appeared in the Automobile Journal, December, 1918 issue, page 62,) You will note that there is shown the commutator end of a motor dynamo, on which, marked M+ and D, are two terminals that are connected with the starting switch, one wire extending from M+ terminal of the motor dynamo to the binding post indicated as M+ on the starting switch. A wire connects the D+ terminal of the motor dynamo with a terminal similarly indicated on the automatic switch. In the description of the wiring in J. P. C.'s reply the failure to separately designate M+ was seemingly a discrepancy in your mind, when the two terminals M and D were collectively referred to. The wiring diagram is correct. You will note this by following the wiring from the motor dynamo to the starting switch.

PREVENTING EXCESSIVE OIL CONSUMPTION.

(E. L., Lawrence, Mass.)

My 75-B Overland touring car requires an excessive amount of oil and has a smoky exhaust. Have had the engine down and find no scores in the cylinders. After installing new piston rings the top one leaf proof, the engine still smokes and pumps oil. The following remedy has been suggested: To take off the oil suction pipe from the pump and brush it, reducing the opening and so reducing the amount of oil circulated. Another, which is said to be very satisfactory, is to bevel the top edge of the lower rings of the pistons and the lower edges of the middle rings. Would this effect the compression? I might add that when I was putting in the new rings and the engine was turned, the cylinder bores seemed to be wiped perfectly clean and the engine seemed to have good compression. I am at a loss to account for the large amount of oil used and why it gets by the rings.

The condition you have stated may be considerably improved by removing the pistons and cutting in each of them a deep groove midway between the middle and the lower rings, and drilling from these grooves through the piston walls, diagonally downward from the grooves to the insides of the piston, from four to six holes with a No. 30 drill. This would have the following result: The grooves would collect the oil and the drilled holes would afford drainage from them to the insides of the pistons. Two grooves to each piston might be better than one, but one had best be tried and if this does not prevent the oil accumulation the second groove might be cut later on.



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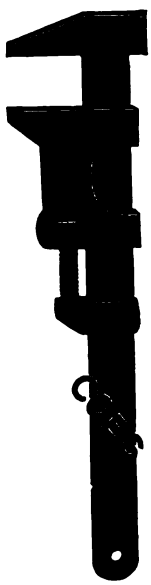
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EXCESSIVE OUTPUT OF GENERATOR.

(F. C. S., Rochester, N. Y.)

I have an Overland, model 75-B. This car came equipped with a make shift two-brush generator; always had trouble with it and last spring discarded same and put in the car a new generator, larger and better made, manufactured by the Auto-Lite Co. This generator has three brushes, one movable, which controls the output. For some time past the generator has gradually made trouble. As I installed this generator on the car it generated about 14 amperes maximum. Lately it has developed a very high output and the ammeter hand wobbles. I would sand the commutator with 00 sandpaper and it would be steady for a few days. The trouble would start again. The commutator would become black and rough and look as though it was burned. I can shift the third brush in either direction and it makes very little difference in output; some, of course, but not as much as formerly. The commutator and brushes also become very hot. Last night I scraped the mica out from between the commutator segments. This helped very much in that it did not spark so much. I also moved the brush against rotation a little further than I formerly had it and almost to the end of its adjustment. I find in riding that where formerly when the generator was working right I got about 14 amperes at 20 miles an hour. I now get over 20 amperes and at 25 miles an hour I now send the ammeter beyond the 30 ampere mark. At 15 miles an hour it now charges about 10 amperes, so you can see the rise in current is very rapid.

I find my commutator is worn more than it should be, and this wear has mostly come in the last few weeks. The brushes do not seem to be worn much. Please furnish me with a wiring diagram of this generator, and give me what advice you can in regard to correcting this trouble? I do not believe the ammeter is at fault, as all the bars on the commutator seem the same—none is burned or blackened more than the others. It is just possible the trouble lies in the field.

There are seemingly two probable causes for such extremely variable current production as you have stated. The one is that the circuit breaker is not functioning and the other is that the insulation of the positive terminal of the generator is defective. Normally the circuit breaker should close, so that the battery may be charged, at a vehicle speed of from six to seven miles an hour. The circuit is not broken, however, until the vehicle speed is from four to five miles an hour. The circuit breaker is so adjusted that there shall not be a time when it shall be constantly opened and closed. The vehicle speed must be sufficiently varied so that it shall be either open or closed. One probable defect is the platinum points of the circuit breaker sticking. Should the platinum points be found clean and not sticking, examine the insulation (bushing) of the positive terminal of the generator. This may be defective and a short circuit existing.

FAULTY CLUTCH ACTION OF CHALMERS.

(H. D., Webster, Mass.)

I have a Chalmers touring car, No. 18A 3041. The clutch will not release. I have tried to restore it and do not find any way of taking out the worn collar. Can you advise me, as I want to put in a new collar?

The car you have is probably 1911 or 1912. It has a multiple disc clutch that runs in a bath of oil. There are several reasons why the clutch does not release. One is that the oil used is too heavy and the plates stick. Another is that the plates are badly worn and may have buckled or broken.

Remove the cover of the clutch housing, drain the oil and wash the clutch thoroughly with kerosene or gasoline. Then examine the plates to determine their condition. There is possibility that new plates are needed. Perhaps the cleaning will restore the normal efficiency.

The clutch is actuated by a bronze ring between the arms of a cast iron yoke. This ring or collar may have either a leather or fiber facing. Possibly refacing the collar will help you considerably. At either side of the collar is a pair of set screws. If these are loosened and backed out the collar should be released and can be slipped out.

There may be a combination of worn collar facing and defective clutch plates. Refacing the collar and replacing some or all of the plates will probably obviate the trouble.

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Allen

This will be an Allen Year in New England.

Every Dealer with an Allen contract will make money.

And every Owner of an Allen car will be a pace-maker for his friends.

Compare it with the others.

$1195

The Allen Motor Co.

In Boston at the Show

Factory Fostoria, Ohio

(When Writing to Advertisers, Please Mention the Automobile Journal.)

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ANNOUNC
MET
MASTER
GEAR DRIV

Metz the Master Builder Presents t
Accomplishment of His Career

The Metz Master Six has been hailed as "The Car of the Year"—a car combining a degree of service and economy never approached before.

Consider the value of this Master Six. And remember that by comparison, true values are established. The price of this car is $1495 f. o. b. Boston, and its makers invite a comparison between the new Metz and any other car selling at $2000 or more.

Its appearance at once marks it as a car of unusual taste and distinction. It is the type of car which appeals to those who demand a correctness of style—a propriety of appearance as well as performance.

And its graceful, sweeping lines are suggestive of the comfort and power which are found in owning and driving the Metz Master Six.

Every unit—every detail of equipment has been selected for its proved quality. From the Timken Axles to the Duplex Radiator of handsome design, the Metz is distinctly a quality car of utmost perfection in mechanical detail.

The new Metz will not be displayed at the Automobile Show, as a worthy and suitable place for it could not be secured. Come and see it at the special opening of our new home, Metz Building, 915-921 Boylston street, on March 15 or any day thereafter.

METZ SALES CORPORATIO
METZ BUILDING, BOSTON

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G the NEW

Z

SIX

N

YOUR INVITATION

demonstrator is at the door waiting your pleasure. You are vited to ride and to judge the lue of the Metz Master Six the basis of comparison. :: ::

PRICE:

ully equipped, f.o.b. factory

$1495.

BRIEF SPECIFICATIONS

UNIT POWER PLANT: **Engine, 6-cyl.**; bore, **3⅛ in.**; **stroke 5 in.**; block cast, **detachable head, enclosed valves. Clutch, Borg & Beck** 10 in. dry **plate. Transmission** gearset, Brown-**Lipe, selective sliding** gear, 3 forward **speeds and reverse.**

COOLING: **Forced water circulation,** centrifugal pump, **special** copper tube radiator, **belt-driven** fan.

LUBRICATION: Combination force feed to engine bearings and timing gears and splash.

CARBURETOR: **Marvel, heated air** intake.

ELECTRIC SYSTEMS: **Westinghouse** two-unit lighting **and starting.**

IGNITION: **Connecticut, independent** of generator.

BATTERY: Willard **6 volts,** 120 hours amperes.

GASOLINE SYSTEM: 15-gal. tank at rear, Stewart vacuum feed.

DRIVE: Tubular shaft, two universal joints.

AXLES: Front, Timken I section, heat treated, Timken bearings. Rear, Timken ¾ floating spiral bevel gears driving, pressed steel housing, accessible from rear, Timken bearings.

SPRINGS: Semi-elliptic; front, 38 in. long, 2 in. wide; rear, 54 in. long, 2 in. wide, underslung.

FRAME: Pressed steel channel section, tapered **rear to front.**

WHEELS: Five **white enameled** wire wheels, rims for **detachable straight** side tires.

TIRES: Goodrich **34x4, six-ply**; round tread forward, **non-skid rear.**

WHEELBASE: **117 in.**; **tread, 56** in.

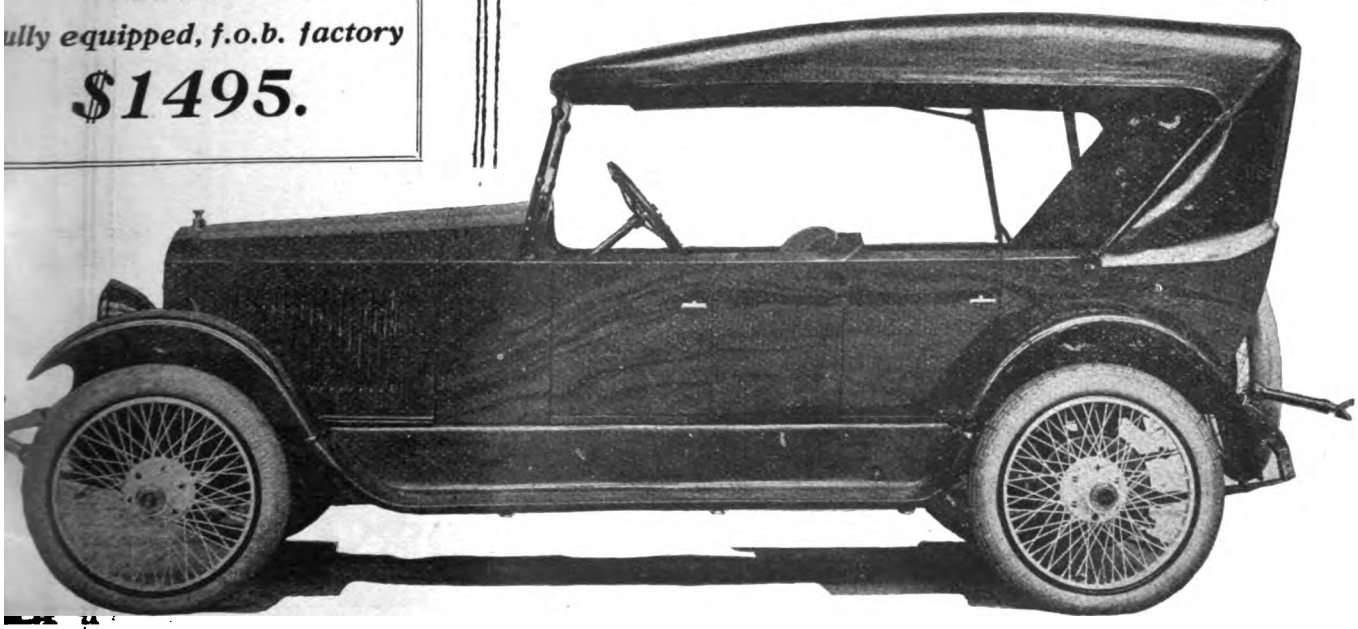
STEERING GEAR: **Worm and gear,** irreversible, **18-in. hand wheel,** left side drive.

CONTROL: **Foot pedals for clutch** and service **brake, ignition and** throttle levers **and horn button** on steering wheel; **center gear shift** and emergency **brake levers; service** brake external **contracting on and** emergency brake **internal expanding** in 14½ in. drums **on rear wheels.**

WEIGHT: Full **tanks, ready for** road, 2625 lbs.

EQUIPMENT: **Dreadnaught** waterproof one-man top; **rain vision** ventilating windshield; **Stewart** speedometer; motor **driven horn**; headlamps with **auxiliary bulbs,** dash, rear compartment **and tail lamps**; Waltham **eight-day clock**; ammeter; oil pressure **indicator**; front and rear bumpers; **extra** wire wheel with special **carrier and** safety lock; robe rail, pump, jack, tool kit, tire repair outfit, ignition lock, license plate brackets.

BODY: Five-passenger streamline Colonial design, **custom** made, genuine buffed **black** leather upholstery, finish **Royal blue with** black enameled guards and trim white enameled wheels, carpeted floor in rear and linoleum covered floor at front and running boards, dull finished walnut instrument board, walnut front panel for rear compartment.



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DORT

Quality Goes Clear Through

At the Boston Show

THERE is, we believe, a genuine preference for the solid virtues that characterize the Dort.

So we are well content to confine our statements about the car to a recital of the simple facts of its own fine performance ability.

It does ride smoothly and comfortably. It grips the road bed closely and drives true.

It gets high mileage from tires, oil and gasoline.

It requires service-attention with gratifying infrequency.

It has those money-saving, time-conserving, comfort-giving qualities that earn the truest satisfaction.

All of the latest Dort models can be seen at the Motor Show.

The pleasing first impression you will gain from their appearance will be thoroughly confirmed in your closer scrutiny of the power-plant and construction.

Touring Car, $925

Fourseason Cars

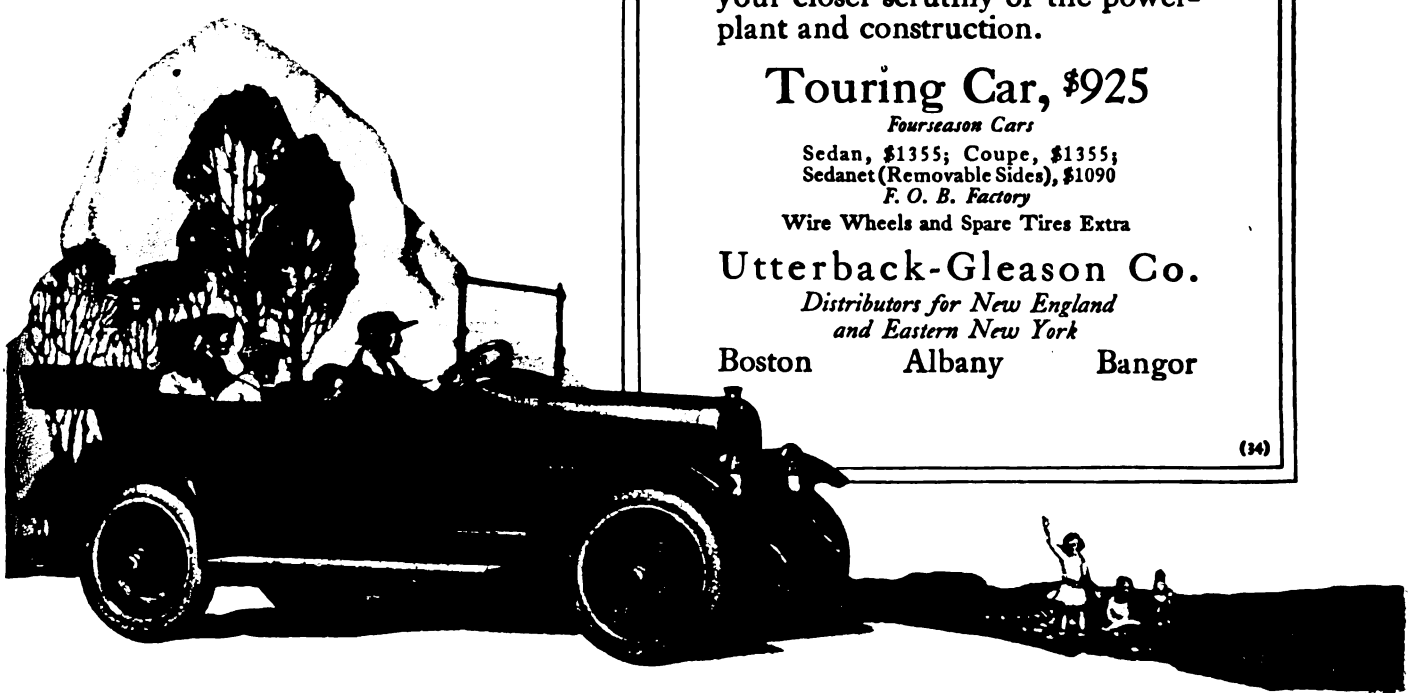
Sedan, $1355; Coupe, $1355;
Sedanet (Removable Sides), $1090
F. O. B. Factory
Wire Wheels and Spare Tires Extra

Utterback-Gleason Co.

Distributors for New England and Eastern New York

Boston Albany Bangor

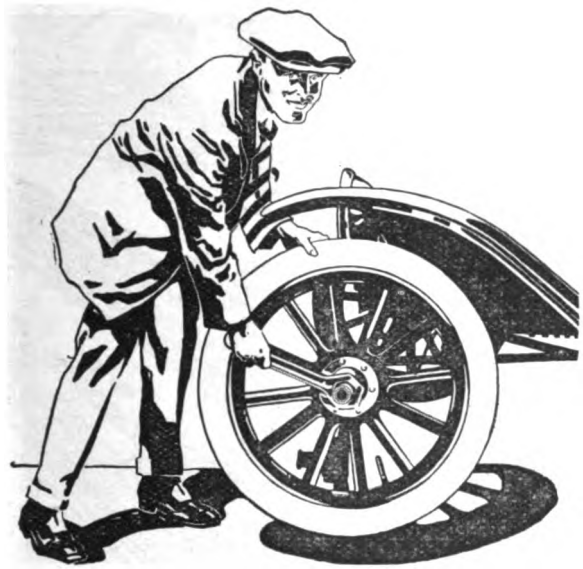
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DORT MOTOR CAR COMPANY

Flint Mich.

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"MINUTE" Demountable WHEELS for FORD CARS

"One nut to unscrew
That's all you do."

Substitutes road confidence for puncture worry.

THE OUTFIT

One extra wheel interchangeable with any Ford Wheel, four "Minute" Hubs, Minute hub wrench, one extra flange.

THE ADVANTAGES

Shoes shifting in sixty seconds!
Tires changed by removing one large nut.
Damaged casings removed without soiling hands and clothes.
Wheels changed without effort—a woman can do it.
Less weight than demountable rims, and better balance—weight on hubs instead of rim.

THE PRICE
$30.

(Denver and West $35.)

Dealers should send for illustrated booklet, describing in detail this time and temper-saving device.

We have a unique direct-by-mail advertising proposition which we offer free to dealers with their initial purchase.
Write for particulars.

Name _____

Address _____

HILL-SMITH METAL GOODS CO.

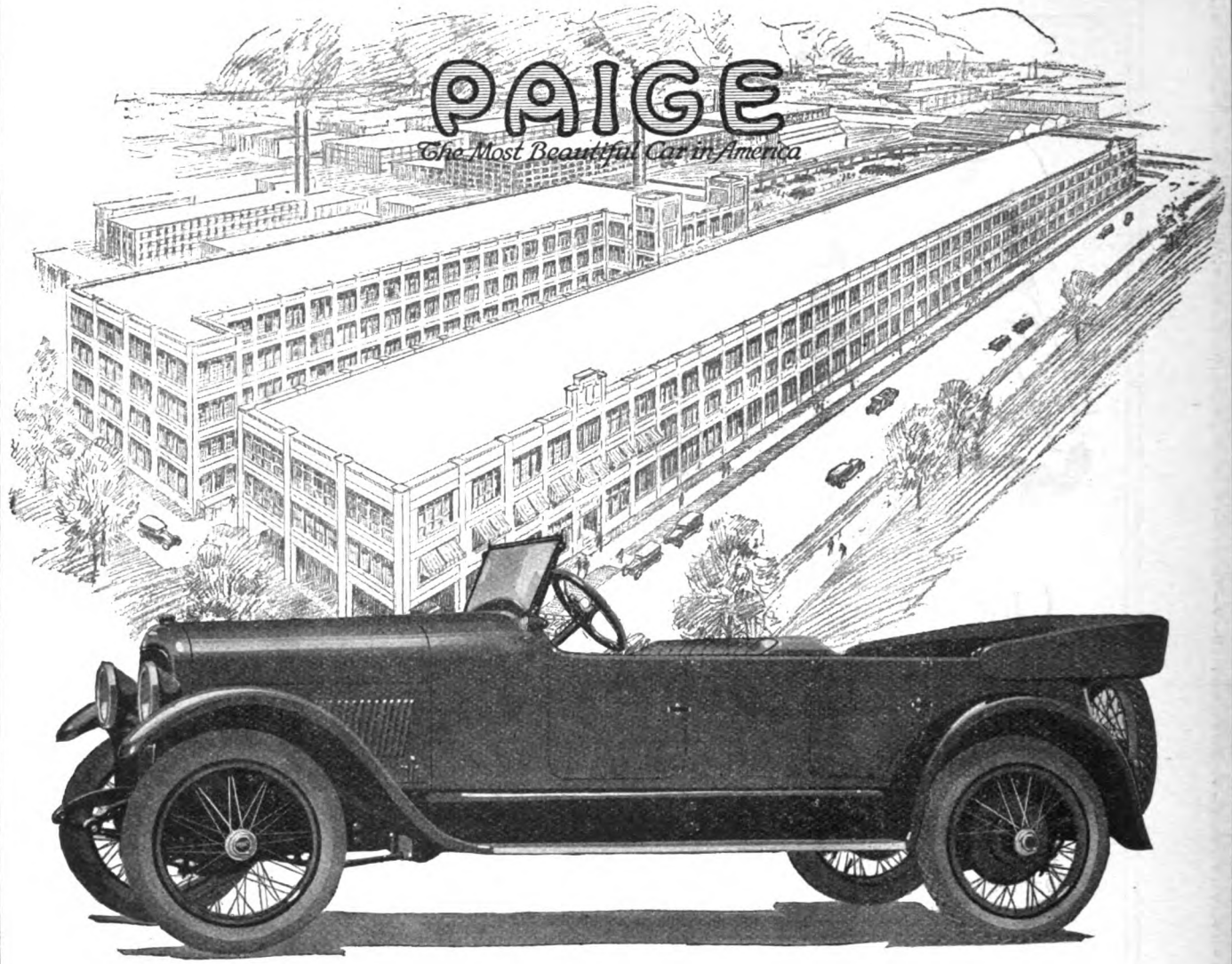
H-S *Quality Repair Parts for Ford and Overland Cars*

82 Brookline Ave. BOSTON, MASS.

MEET US AT THE SHOW—Spaces 513—514—515.

(When Writing to Advertisers, Please Mention the Automobile Journal.)

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The Motor Car Shows

of this after-the-war year of 1919—New York, Chicago, Detroit, Philadelphia, Minneapolis, Boston, all of them East and West, have brought home to us some vital and most gratifying truths.

This year 1919 is NOW and will continue to be the greatest year in the history of the Paige-Detroit Motor Car Company.

Paige sales at the shows have been enormous, in many cases unprecedented. There never has been such a nation-wide, a world wide demand for Paige Cars.

That is highly significant. It confirms our judgment in planning the enormous Paige Production for 1919. That is already a reality

But still more important to us the Shows have brought home to us the confidence, the enthusiasm, the wonderful loyalty of Paige Dealers from Coast to Coast.

That today is the most valuable, the most highly prized asset of the Paige Company—the conserving loyalty of its Dealers—built on the years of manufacturing supremacy, tested by ten years of mutual business success.

Paige Dealers are "sold on" the Paige Company, Paige Cars, Paige Leadership and Paige Integrity.

They are ready and we are ready for the Record-Breaking Year.

PAIGE-DETROIT MOTOR CAR COMPANY, DETROIT, MICHIGAN

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SUCCESS

A TALK TO DEALERS

Big live prosperous dealers all over the country are waking up to the tremendous possibilities of selling the Grant Six.

They are coming to realize that people are still thinking in terms of thrift and likely to be thinking in such terms for some time to come.

They are coming to realize that the way to *big sales* is to sell a car for which *big demand* exists.

They know they can't make so much money *per car* selling the Grant Six.

But they know they can sell *more cars* and sell them faster—and they know that as a distributor or dealer the really *big operations* are confined to cars below $1300.

And they know that the Grant Six offers *more* for the money—in actual car *value*—

And everywhere these wide awake merchants are finding the Grant Six contract extremely agreeable, *satisfactory* and *profitable.*

There is considerable satisfaction in selling a car that has made good for five seasons,

And this satisfaction is *intensified* when in addition comparisons on a sheer value basis indicate *superiority.*

Whether you do business in the East or in the West, in the North or in the South, you will find the Grant Six an *extremely live* and *attractive proposition.*

The time to act is now. Write us regarding the territory you are interested in. Next week may be too late.

Demountable Sedan $1400

All-Weather Sedan $1645—Coupe $1625

Five-Passenger Touring Car $1120—Roadster $1120

All prices f.o.b. Cleveland.

Grant Motor Car Corporation
Cleveland

GRANT SIX

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FOR EVERY MOTOR NECESSITY

SEND FOR CATALOG No. 300

WALDEN-WORCESTER, INC.

WORCESTER, MASS.

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REO

Eventually —But Not Now!

We cannot say in truth that the Reo Motor Car Company needs any more dealers at this time.

You know the conditions so well, 'twere a waste of space to explain that at this time Reo is suffering mainly from a tremendous over-demand.

Of course over-demand is the normal condition with Reo.

The Reo dealer's plaint is always, "If only I could get enough Reos." Aggravating that, from the dealer's standpoint as well as from ours.

But mighty satisfactory in the long run!

A lot of makers would like to change places with Reo!

And a lot of dealers who have to force every sale, are looking forward to the time when they may secure the line that sells itself and stays sold.

That's Reo—of course!

We have some plans that will relieve conditions in the near future.

And so we are ready to entertain proposals from the right kind of dealers in territory where Reo is not now properly represented.

Dealers who appreciate the tremendous possibilities in Motor Trucks as well as passenger cars given preference.

All correspondence held strictly confidential.

Better get in line now.

If you wait there will be others—your own rivals—ahead of you.

Dealers who handle the Reo line are always "lucky."

Eventually every dealer hopes to handle Reos—get in line now. You never can tell just when the plum may fall.

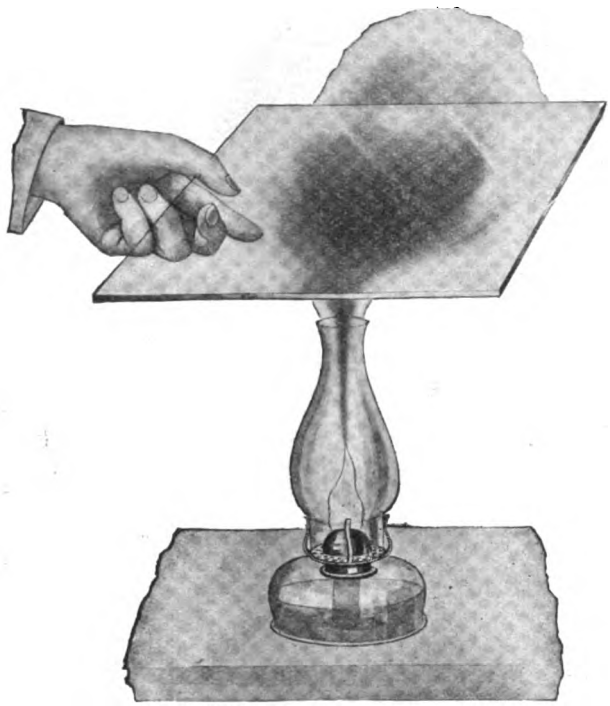
Reo Motor Car Company

Lansing, Michigan

"The Gold Standard of Values"

(When Writing to Advertisers, Please Mention the Automobile Journal.)

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THE SMOKED GLASS

Soot on the smoked glass is nothing more nor less than the much talked of "carbon deposit" found in the cylinders of the automobile.

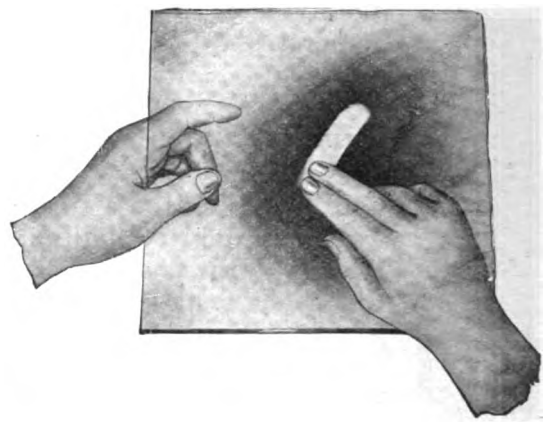
Even the proper use of any petroleum oil as a lubricant is bound to leave more or less carbon in the combustion chamber of an automobile and the excessive use, which often happens, increases the deposit.

If no other ingredient but carbon were deposited much of the carbon trouble might be eliminated, but some oils, notably those manufactured from a paraffine base crude, deposit, also, a gummy, sticky substance in the combustion chamber which collects the free carbon, holding it for the action of the excessive heat—this heat forms a cement which hardens into the scales usually found after a few thousand miles driving.

Easily Rubbed Off

The soot on the glass is easily rubbed off with the fingers, and so may the soot or carbon in the cylinders generated from asphalt-base oils be easily rubbed off or blown out with the exhaust.

Consequently, a lubricating oil which is manufactured from Southern asphalt-base crude, containing no paraffine, must necessarily leave less carbon in the chamber, as it contains no gummy-sticky substance to cement the free carbon.



The Answer Is Obvious

Use an oil that is free from paraffine—less carbon and MORE POWER is the greatly desired result.

When we say there is **more power** in SUPREME AUTO OIL we mean there is less carbon deposited, for the reason that this sterling product is manufactured from Southern asphalt-base crude oil containing no paraffine to gum and stick.

Neither is there any foreign substance in SUPREME AUTO OIL that might prevent the most efficient lubrication of any engine, be it a four, six, eight or twelve.

There is MORE POWER in
THAT GOOD GULF GASOLINE
AND SUPREME AUTO OIL
MANUFACTURED BY
GULF REFINING COMPANY
PITTSBURGH, PA., U. S. A.

Gulf Refining Company

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Brunswick Cords

Increase Brunswick Prestige



ONE Brunswick Cord will convince you of the superiority of Brunswick Tires. Keep its record. Make comparisons and then decide if you ever knew its equal. You will be led to adopt a new standard in judging tires.

How far a maker cares to go in giving as little or as much for the money as possible depends upon his ideals. Every man expects more than the average from a product bearing the famous name of The Brunswick-Balke-Collender Co.

The Brunswick idea is to pay perfection's price and produce an article which will sustain the reputation of this great old institution.

Brunswick ideals, as interpreted in Brunswick Tires will appeal to you, if, like most men, you are interested in getting 100 per cent value.

We recommend to you the Brunswick Cord.

BRUNSWICK TIRES

and Tubes—Plain, Skid-Not and Ribbed Treads

There's a Brunswick Tire for Every Car—Cord, Fabric, Solid Truck

We Offer to Dealers a Unique Opportunity. Write Us for Proposition.

THE BRUNSWICK-BALKE-COLLENDER COMPANY, General Offices: **623-633 S. Wabash Avenue, Chicago**

Branches in the Principal Cities of United States and Canada

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YOUR DEALER SELLS THEM

SPECIALTIES



The Mosco Valve Grinder

This tool differs radically from others in several respects. It is really more of a machine than a hand tool, as it renders valve grinding an accurate mechanical operation rather than a guesswork hand job. It has been found that a much more rapid motion can be obtained with the Mosco Grinder than with the ordinary tool, resulting in a very superior finish on the seats.

The device is made of the best materials and is thoroughly guaranteed in every respect. At the low price at which it is listed there should be one in every kit, when it is considered that it is offered not only as a tool, but as a QUICKER, SAFER and BETTER METHOD of valve grinding.

PRICE, $2.00.

SIZE (IN CARTON), 3⅝x6¼x3⅝. WEIGHT, 30 OZ.

Mosco Socket Nut and Bolt Holder for Ford Car

A REAL TIME SAVING DEVICE. Takes the place of that other man whose help is usually required for this operation.

Simply slip MOSCO Nut and Bolt Holder over the top of each engine or Transmission nut or bolt head, the wings protruding above the hex socket engage wall of crank or transmission case and prevent nut or bolt head from turning while the man underneath the car unscrews the bolts.



Position Crank Case Bolts.

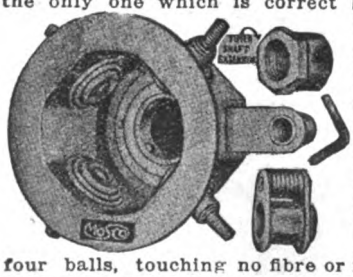
When replacing put head of bolt on top, slip on the MOSCO socket and proceed as in taking out.

Made of heavy pressed steel, with reinforced wings welded to body of socket. All case hardened and finished bright.

PRICE, 20c EACH.

Improved Bemus Ball Contact Timer for Ford Car

The BEMUS is an IDEAL TIMER for the Ford high speed, short stroke engine, because form of contact is the only one which is correct both electrically and mechanically. This is made by a hardened tool-steel brush, mounted on eccentric cam, engaging spring-pressed steel balls with glancing impact, both the brush and the balls turning each time so that fresh contact surfaces are continually made. The brush comes in contact only with the four balls, touching no fibre or insulation.



MOUNTING is direct on the time shaft by means of an extension piece which is screw threaded on to shaft, and runs in ball bearing placed in recess of timer shell. This means that each of the balls is equidistant from the brush. **RESULT**—absolute precision of timing.

SIZE (IN CARTON), 3¾x3x2. WEIGHT, 9 OZ.

PRICE, $2.50.

Mosco Floating Plunger Wheel Puller

Starts a "Frozen" or "Stuck" wheel instantly. Strike the plunger; turn the screw, strike again and the wheel comes off without injury to hub-threads, spokes or axle.

Made for 200 models of 50 popular cars.



Mosco Valve Spring Compressor for Ford Car

The use of the MOSCO Valve Spring Compressor eliminates what is usually a troublesome operation, viz., the compressing and replacing valve of springs. By using this simple device springs can remain in position until grinding of valves is completed.

It compresses two valve springs at one operation and permits removing of pins. Should the pins be crosswise turn valve around until they are in position to pass through slots in compressor. After grinding valves reverse above operation. Made of heavy pressed steel.



In Place Compressed.

PRICE, 50c EACH.

Mosco Jiffy Bushing Remover

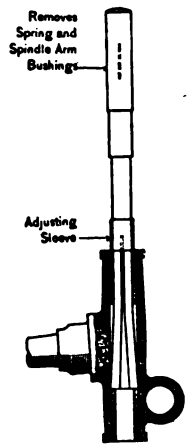
Patented U. S. A., Oct. 17, 1916. Canada, Aug. 6, 1918.

For Ford, Dodge, Overland, Chevrolet, Maxwell, Saxon, Dort and all cars, trucks and tractors using ⅛ in. spindle bolt.

A practical tool. Removes bushings from steering knuckle, spindle arm and springs, and does it so quickly that it pays for itself the first time used. Fitted with sleeve which keeps split end of tool compressed until properly located, when it is automatically released.

Made of steel, case hardened.

PRICE, $1.50.



Mosco No. 200 Timer for Ford Car

The case is made of extra heavy pressed steel, finished in aluminum. Gray bone fibre is used for raceway, with steel inserts dovetailed in and all lathe finished to a polished surface. The threaded terminals are insulated by fibre washers all the way through to contact points, thus removing cause of short circuiting common to this style of Timer.

PRICE, Complete with Brush, $1.50 EACH.



Patented Oct. 31, 1916.

The "Mosco Trade Mark is a Guarantee of Quality

MOTOR SPECIALTIES COMPANY, WALTHAM, MASS.

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Be-Be-Co
TRADE MARK

IT PAYS TO SATISFY

The extreme in car appearance is now demanded by all owners. When buying specialties that will afford the results, they willingly pay for the quality products that will satisfy them.

The jobber or dealer who sells inferior goods cannot long retain his standing and prestige. Car specialties made just to sell will never bring or hold patronage or add to the profits of a dealer.

The trade can always recommend and sell the trade mark BE-BE-CO'S car specialties. The customer' s car will retain its new appearance and once served with the tried and proven BE-BE-CO'S product, no other will satisfy.

The BE-BE-CO'S specialties are supreme. They are the products of specialists who have developed a world wide business—who have built their reputation on the quality of what they offer today. BE-BE-CO'S specialties are sold wherever cars are used.

There is a BE-BE-CO'S specialty for almost every car need. All of the same sterling quality and merit—extremely easy to apply and affording quick and enduring results.

Be-Be-Co
TRADE MARK

BE-BE-CO MOHAIR TOP DRESSING is an especially prepared finish for mohair tops, curtains and slip covers. It gives a dark, silky lustre to faded and dingy mohair. Will never come off. One application makes a faded top look like new.

BE-BE-CO LEATHER TOP DRESSING will make a worn and leaky top look like new. It is absolutely waterproof and fast black. It will not crack or chip off. There is another full season's wear to a top if this dressing is used.

BE-BE-CO CUSHION DRESSING will make cushions look like new without leaving the cheap, painty appearance of ordinary dressings. It makes upholstery last longer and always looks trim. Our business for twenty-nine years has been in making dressings, preservatives and dyes for leather.

(Sold in sealed containers—Pints, Quarts and larger packages.)

BE-BE-CO O-SO HAND SOAP is a pure, oil soap, giving a rich, creamy lather containing pumice to remove the grime; economical, because it is not full of water. Great for the automobile owner. 10c and 25c cans.

Exhibiting at the Boston Auto Show—Space No. 704.

Manufactured Exclusively by the

BOSTON BLACKING COMPANY

Home Office: THIRD STREET, EAST CAMBRIDGE, MASS.

Branch Offices and Warerooms in All Large Cities in United States and Abroad.

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PROMPT DELIVERIES

PERSONAL SERVICE

Distributors Of Automobile Accessories

MITCHELL & SMITH INC.

1090-1092 COMMONWEALTH AVE
BOSTON, MASS.

NEW ENGLAND SALES AND SERVICE

Hayes Wire Wheels

All Makes of Wire Wheels Repaired and Enameled.
Large Stock of Parts on Hand.

Detroit Storage Batteries

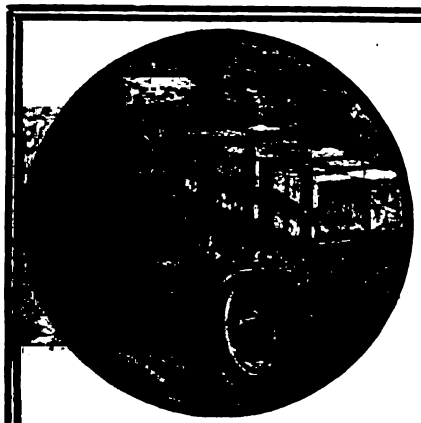
COMPLETE STOCK.
PARTS FOR ALL MAKES OF BATTERIES.
Repairs, Recharging, Etc.

We Solicit Your Orders On

Fan Belts, Gaskets, Spring Bolts, Bushings, Piston Pins and Small Parts Made to Your Specifications.

EXHIBITING AT THE BOSTON SHOW
SPACES NO.
537-38-39

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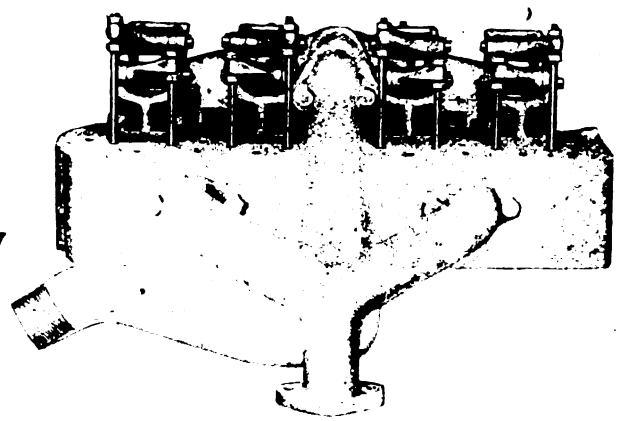


Stupendous Power

Results of Standard Brake Horse Power Test

Standard Ford with regulation carburetor, 18.7 B. H. P. at 1310 R. P. M. ROOF 16 Valve Head with regulation carburetor, 22.4 B. H. P. at 1460 R. P. M.

ROOF 16 Valve Head with special carburetor, 29.7 B. H. P. at 1590 R. P. M.



COMPLETE—READY FOR INSTALLATION

Not a Thing Extra to Buy

PRICE COMPLETE $100, F.O.B. Anderson Indiana

Manufacturers and Distributors of Ford Speed Specialties

3 to 1 gears, high speed cam shaft, light gray iron pistons, aluminite and lynite pistons, aluminite connecting rods, racing spark plugs, racing carburetor, roller bearings, counterbalances, wire wheels, multiple speed transmission, high tension magneto, special oiling system, special worm and gear steering gear, racing tires, racing bodies, hood and radiator, parts for underslinging chassis.

Tell us what you want. We can supply it. Best quality —lowest prices.

Lightning Speed

Hill climbing by your touring car beyond your wildest dreams



ROOF 16 OVERHEAD VALVE EQUIPMENT

Will Give You This POWER or SPEED

For Commercial Fords

Before the motor truck took its place as the standard of hauling, the strength of the horse that pulled the old style truck was referred to as "brute force."

Now, in the motor truck, it is translated into stupendous, unrelenting power—the more of it the better.

Converted Ford trucks—or passenger Ford chassis with commercial bodies—have tremendous power if you know how to get it out. ROOF 16 Overhead Valve Equipment brings it out, harness it for service, and it **pulls.**

All the speed of the racer goes into power when ROOF Equipment goes onto your Ford commercial car. A steady, dependable, and even power results. It doubles the value of commercialized Fords.

TOURING CARS

Your touring car motor equipped with 16 overhead valves insures you hill climbing feats such as you never dreamed of before. Your Ford becomes a high gear car thru sand and mud and up the very steepest grades, and high priced cars have but little chance to compete with you in general road work.

From the standpoint of motor service your Ford touring car enters the very highest class, and the added power gives you record speed if you care to use it.

For Speedsters

You can literally feel the back of the seat push you forward when you open the throttle of a Ford speedster equipped with ROOF 16 Overhead Valves. Join the growing list of record makers.

Racing Drivers with High Speed Records With Roof Equipment

Jos. C. Hayes, San Francisco, holder of Pacific Coast record for one mile and half-mile tracks, time being 52 seconds. Mr. Hayes has attained a speed of 97 miles per hour.

Ben Lawell, winner of many racing contests of from 1 to 50 miles and owner of the fastest racing Ford.

Bob Cusick, winner of the half mile championship for the State of Iowa.

W. L. Fraser, Washington, D. C., winner of many fast short distance contests.

Herbert Black, Webster City, Ia.; Wm. E. Frank, Jenkintown, Penn.; Rolly Blair, Shelby, Nebr.; Cliff Duhme, Cincinnati, Ohio; L. E. Kerbs, Otis, Kans.; Irving Donohoe, Washington, D. C.; Corp. Paul Boozer, Fort Barrancas, Florida, and hundreds of others with fast records.

Overhauling time is nearly here. Think of what you are going to do to the Ford this Spring. If it is working for you in your business, make it a better employee. Give it greater power and a chance to make good. If it is your passenger car, put it up with the leaders and keep it there. Tell your garageman, when he overhauls either truck or passenger car, to install ROOF Equipment for service.

Send for our complete literature on how to build fast cars and double the value of your converted Ford Truck and descriptive circular on Ford Speed Specialties.

The Victory Motor Company, 58-60 Brookline Ave., Boston, Mass., Distributors will exhibit our Cylinder Head Equipment at Boston Show, March 15th to 22nd inclusive.

Address Production Manager

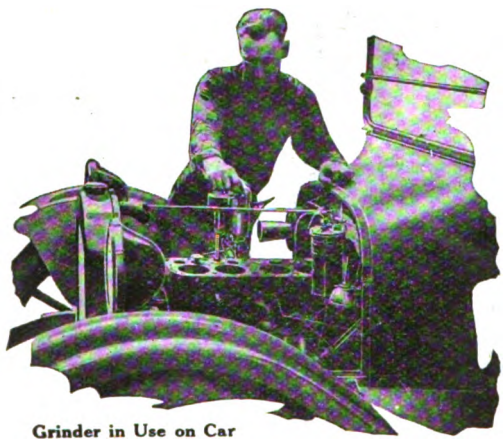
LAUREL MOTORS CORPORATION

ANDERSON, INDIANA

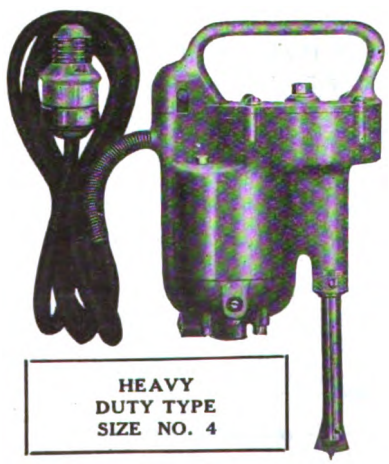
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JACKSON
Electric Valve Grinder

Cuts Out Losses and Puts New Profits in Their Place



Grinder in Use on Car



HEAVY DUTY TYPE SIZE NO. 4

THE JACKSON ELECTRIC VALVE GRINDER that can make good in War, can make good in Peace. It can make valve grinding a profitable part of your business with profits worth considering. It will speed up overhauling, make better satisfied customers, and will bring you new business. Your shop with a JACKSON ELECTRIC VALVE GRINDER can make more money by doing better work with less effort.

Hand Valve Grinding Does Not Pay

Every time an employee in your shop grinds a valve by hand he automatically checks up on your books a loss. If he is a skilled laborer —and to produce expert results he should be—many valve grinding jobs taken at such a loss will prove to be a decidedly bad investment for you.

But when this same employee—or an unskilled laborer, at a decidedly lower salary—with a JACKSON ELECTRIC VALVE GRINDER, can do the same work just as well or better in less time, and show a liberal profit, isn't it worth while to investigate the machine that will bring this profit out of an old established loss?

DEALERS:—Send Coupon for Prices and Full Information.

JOBBERS:—Get in Touch With Us.

Send This Coupon for Full Information—NOW!

Kalamazoo Railway Supply Co., Kalamazoo, Mich

Gentlemen:
Please send, without obligation, full particulars regarding the Number Four heavy duty type JACKSON Electric Valve Grinder.

NAME.....

ADDRESS.....

My jobber is.....

Kalamazoo Railway Supply Company

Kalamazoo, Mich.

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THE AUTOMOBILE JOURNAL

VOL. LXVI. PAWTUCKET, R. I. MARCH, 1919. NO. 8.

BOSTON'S LARGEST AUTO SHOW

More Than 70 Makes of Passenger Cars and 350 Displays of Accessories and Equipment Will Be the Attractions of New England's Annual Exposition.

FROM a passenger car standpoint the Boston Automobile Show, March 15-22, is expected to take precedence over the New York and Chicago shows, and the officials have expressed confidence that it will prove the biggest and best ever held in the United States.

Only passenger cars and accessories will be displayed, as the basement of the Mechanics' building, where the exhibition is to be held, is still occupied by the War Department and is, therefore, not available for a truck show.

The show will assume great importance because of the remarkable demand for passenger cars in New England and vicinity this year. The mild winter weather has left the roads in good condition, and motoring has been enabled to get a much earlier start than in most previous years.

That the demand for new cars will exceed the immediate supply is practically assured. The factories, transforming from a war to a peace basis, have not reached normal production, and cars are not being made fast enough to meet the orders from buyers.

On this account the used car will undoubtedly be a big factor this season. Persons unable to procure a new car will prefer to buy a used one, rather than go entirely without one. This result will greatly stimulate the buying of accessories.

Never were the Boston dealers more interested in a motor car show. In previous years the manufacturers in the National Automobile Chamber of Commerce were sponsors for the New York and Chicago shows, but they decided to forego exhibitions this year as a war measure. Dealers in those cities disagreed with the attitude taken by the manufacturers and the dealers decided to hold exhibitions on their own account. Their shows proved so successful that the manufacturers realized their mistake. The manufacturers will cooperate in every way with the Boston dealers in making the show a tremendous success.

Will Display 70 Makes of Cars.

The Boston Automobile Dealers' Association will be the host. Chester I. Campbell, without whom no Boston show would be complete, will again be man-



Chester I. Campbell, General Manager Boston Automobile Show.

Mechanics' Hall, Huntington Avenue, Boston, Where the 17th Annual Automobile Show Will Take Place March 15-22.

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ager. There will be approximately 70 different makes of cars and about 250 different accessory exhibits.

The Boston show will take first importance because here, for the first time since the war ended, the manufacturers will be in a position to exhibit their post-war product. The factories had not time to get back to anything like normal production before the New York and Chicago shows, coming so soon after the signing of the armistice. Most of the exhibits at the New York and Chicago shows were of vehicles made before the armistice was signed, and the only really important new features were in the body designs.

Having had ample opportunity to prepare for the Boston show, and aided by suggestions received at the other shows, the manufacturers have turned out models that are bound to create wonderful interest.

Some of these new models will reveal improvements that have been incorporated since the fighting in Europe ended and will reflect lessons learned by war experience. A few new cars never before exhibited in Boston will be on display.

Bodies Will Be a Prominent Feature.

The body display is certain to be an outstanding feature, just it was at the New York show, and the regular standard bodies will reveal many new lines. The show will emphasize that the age of the custom made body is coming into its own.

Many of the buyers of expensive cars are going in for bodies of their own design. The special body, however, is not confined exclusively to the high priced cars, for a number of body concerns have come forth in the past year with designs for the cheaper cars that give them a decidedly smart and distinctive appearance. To these are added over-sized tires, wire wheels and special equipment, all tending to refine the lines.

The "all-year-round" types of cars are growing in popularity and most of the exhibitors will show enclosed models.

The accessory display will be a big competitor with the cars for the interest of the visitors to the show. Thousands of motorists who are planning to buy cars this year will have a vital interest in the accessory department, where every known device that tends to make motoring more comfortable, cut down the overhead and save labor, will be on exhibition.

Manager Campbell having decided not to conduct an overflow show at Horticultural Hall this year, advantage was taken of its being idle to hold a reconstructed car show under the management of George B. Cousins. He has taken over the entire space there to exhibit rebuilt cars of many well known makes.

Truck Dealers to Show in Sales Rooms.

The truck dealers will have exhibits in their own sales room during the week of the show. Information as to the quickest and best ways to reach these places will be given at the exhibition in the Mechanics' building.

More than 5000 dealers in cars and accessories in New England have been registered with the show management. Some of the Boston dealers have territory that comprises a large part of New England, and occasions of the annual shows are always taken advantage of to have dealers' conferences.

Persons from various towns will find representatives of their local automobile companies at the show, to receive them and serve them in any way possible.

Decorations the Best Ever Designed.

As is always the case for an automobile show, Mechanics' building will be extensively decorated. A novel scheme has been worked out to transform the interior of the great halls and to provide a suitable background for the cars and accessories. The building will be a mass of color and lights. It will be the most gorgeous setting that E. W. Campbell, the designer, has ever arranged for an automobile show.

The motif, according to Mr. Campbell, will be both original and new and the effect at once beautiful and dazzling.

The decorations will be remarkably



J. H. MacAlman, President, Boston Automobile Dealers' Association.

elaborate and will be emblematic of Victory, Peace and Prosperity. It will be the most elaborate decorative scheme ever carried out at a Boston automobile show. Tens of thousands of electric lights and the national colors and those of our Allies will be used profusely.

The deeds of the New England soldiers in France will be commemorated at the entrance to Exhibition Hall. Large bronze escutcheons encircled with laurel will bear the records of the engagements in which the soldiers of this section participated and between these escutcheons there will be stands of the national colors, the whole being brightly illuminated.

The cooperation of America with the Allies will be typified inside of Exhibition Hall by more than 100 scenic tablets, the stars and stripes and the flags of the Allied nations, together with a golden sunburst forming an illuminated archway down the main isle of the hall. On either side will be figures representing the rewards of victory. These will stand on marbleized pedestals and over each will be the American colors.

Crystals and pendant silk ribbons in red, white and blue, fringed with glass drops, together with a great number of electric lamps, will produce a novel lighting effect. The wall spaces of the hall will be covered with panels in red and gold. At the upper part of each panel will be diamond fretwork with a small gilded eagle in the center, from which a sunburst in gold will hang by a black supporting rod, the gilded pendant having as a center a bas relief American shield enameled in colors.

The windows will be screened with smilax. The light well in Exhibition Hall will have a canopy of many hued fabrics from which will hang an electrolier 30 feet in diameter, containing hundreds of lamps of various colors. Upon the balcony side will be bright color effects and panels.

Grand Hall, likewise, will be given a most elaborate setting, in which an effect similar to that in Exhibition Hall will be produced by the employment of the national colors and by extensive use of electric lights, scenic paintings and the like. Another innovation will be the reflected lighting of the cars from concealed lamps.

In Grand Hall the columns of honor bordering the center aisle will be rendered in Nubian marble and dull gold, nearly 25 feet high, surmounted by gilded statuesque eagles. Graceful arches in electric lights will connect these and span the aisle. Wreaths of laurel will face the sides of the columns and over them will be the most elaborate and striking beautiful electrolier ever produced for a Boston show. The outside dimensions of the body itself is about 30 feet, while the spread of the illuminating arms radiating from it will reach out nearly 80 feet.

"There isn't a single doubt that the show will prove to be the greatest selling show we ever had," said Manager Campbell. "The mild weather of the past few weeks has got the motor car virus into the veins of the public. This, with the knowledge that there will be a scarcity of new cars, will have a tendency to bring some phenomenal sales. I will be greatly disappointed if all previous records in attendance and sales are not broken."

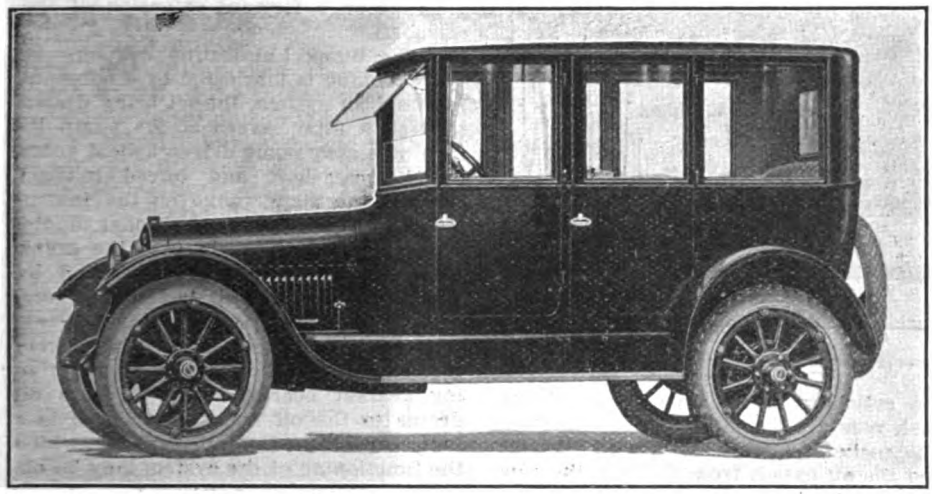
Partial List of Boston Automobile show exhibitors on Pages 64a, 64b, 64d and 65.

BAY STATE OPENS SCHOOL FOR CAR OWNERS.

The Department of University Extension of the Massachusetts State Board of Education is to conduct a class in gasoline automobiles in the Boston University School of Law. There will be 10 lessons. A charge of $2.50 will be made to cover the cost of books and materials used in the course. The instruction will deal with the mechanism, operation and care of gasoline cars. Arthur Ashworth, who has had considerable experience as an automobile school instructor, will have charge.

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THE MODEL H BUICK 1919 SERIES



Buick Model H-Six-47 Five-Passenger Sedan.

BUICK valve-in-head six-cylinder open and closed cars for this year are so varied that any purchaser can select a body type that is exactly equipped to serve him in the utmost limit of his demands for utility, economy and operating satisfaction. Each model has a certain scope, a particular range of usefulness. Twenty years' experience, with the absence of radical departures in manufacture and design, has made possible the development of Buick cars as a thoroughly consistent whole, the designing effort being evenly distributed over the entire car every season, in order that no detail of its complete utility should be neglected.

Convenience has been developed side by side with efficiency. Comfort has increased in the same ratio as strength and long wearing qualities. New and better body types have been devised, while lighter and stronger materials were being brought into service. And for 1919 the Buick cars reach the highest pinnacle in this development.

The completeness of detail in Buick cars adds materially to comfort. Buick riding qualities are chiefly due to specially designed spring construction. The power not only meets all ordinary requirements, but all emergencies. Buick economy applies to repair bills as well as to gasoline and oil. The upholstery and finish of these cars are exceptionally fine and durable. Each of the models has its special features, such as dome lights, illuminated instrument boards, special locks to thwart thieves, pockets for storing small parcels and numerous other conveniences.

The Six Buick Models.

The Buick Model H-Six-44 ($1495) posseses marked advantages for the man or woman who wishes a car of limited passenger capacity, with an exceptionally roomy and comfortable driving compartment. The body is distinctly a Buick creation, broadening out to have a wide, deep seat for three, then curving in at the back to form a trim rear deck with a weather proof carrying space for luggage.

The Buick Model H-Six-45 ($1495) is a very dependable open car for five persons, designed to meet the multitude of uses made of such a car. It differs from the seven-passenger model only in tonneau and chassis length, possessing the same degree of ruggedness, easy flowing power and mechanical excellence. The driving compartment affords unusual comfort. The tonneau is even more liberally proportioned. The seat is full three-passenger capacity, set at a comfortable angle.

The Buick Model H-Six-46 ($1985) is a true coupe model, with permanent sides and roof, and its serviceability in all road or weather conditions at any season of the year makes it as widely useful as it is comfortable. A Pullman type chair is provided for the driver, with a wide seat for two set slightly back of the driver's seat. A fourth passenger may be accommodated on the extra seat which swings out of the way under the cowl.

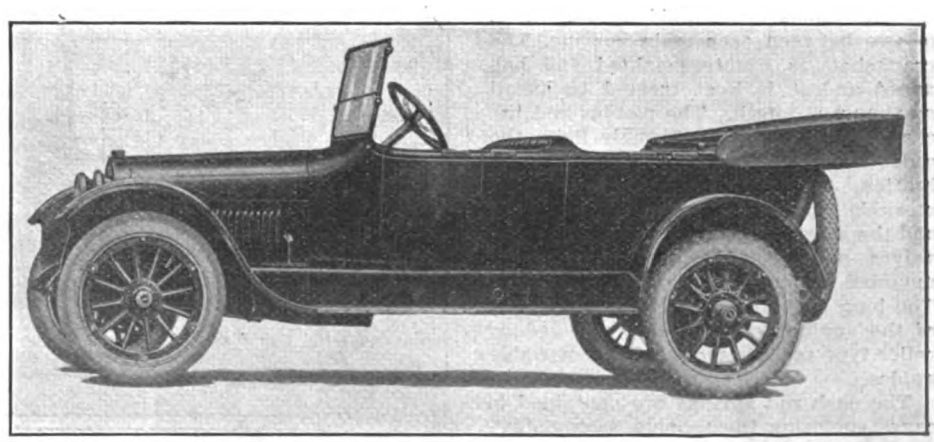
The back window is permanent, while the side windows may be lowered, the door windows being equipped with patented handles to adjust the ventilation in conjunction with the three-piece windshield, which is of the storm vision type. Back of the driver's seat is a carrying space, with another in the rear deck.

The Buick Model H-Six-47 ($2195) follows the design of the big seven-passenger Buick sedan very closely, the principal difference being in the wheelbase and seating capacity. The driving compartment is roomy, with the front seat extending clear across the body. The rear seat accommodates three with perfect comfort. Cold weather snugness or summer driving comfort are equally available by adjusting the three-piece windshield and moving the windows up and down by means of patented handles.

The Buick Model H-Six-49 ($1785) is a big, roomy, open car for seven persons, with a range of service in keeping with its powerful valve-in-head motor. The long wheelbase, the extra size tonneau, the completeness of all details making for comfort and convenience give it an air of unlimited utility that is amply borne out by its continued and consistent service. The car is divided amidships by a double cowl, into which the folding chairs disappear when not in service. These extra chairs are so arranged as to give liberal space both for the occupants of the chairs and of the rear seat, to avoid possible crowding or cramped positions. The slanting windshield braces form the front support for the one-man top, which is also equipped with close fitting side curtains that swing open with the doors.

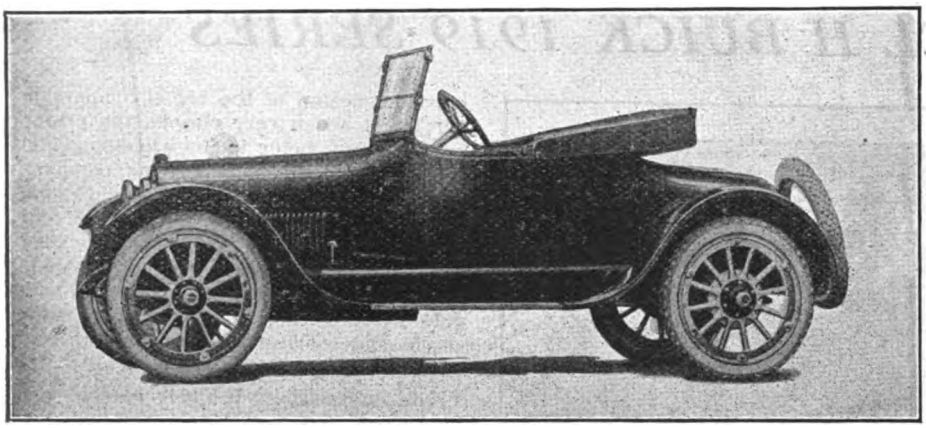
The Buick Model H-Six-50 ($2585) four-door sedan represents the latest development in the closed car design. The front seat, instead of being divided, is full width, giving additional roominess for passengers and providing an extra brace to the body, which adds considerably to its stability. This arrangement adapts the Buick sedan for any service for which an open car is used, with the added utility and comfort that belongs exclusively to the closed car.

The main compartment accommodates two disappearing chairs. Silk shades on rollers afford privacy or shut out too intense sunlight. Ventilation is controlled by the adjustable windows and windshield, the door windows being fitted with patent handles. There are two corner dome lights. Both rear doors and the left front door lock inside, and the right front door from the outside, to insure safety when leaving the car.



Buick Model H-Six-49 Seven-Passenger Car.

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Buick Model H-Six-44 Three-Passenger Car.

Have Larger Engine Power.

The Buick cars have always been noted for adequacy of power and for smoothness and flexibility of the engines. This has been largely due to the valve-in-the-head construction, which affords large power development for the engine rating, low fuel consumption and exceptional endurance. Engines for the Buick model model H cars are identical in every detail.

These are a six-cylinder, water cooled, four-cycle, vertical, I head type, with cylinder bore of 3⅜ inches and stroke of 4½ inches, which has rating of 27.40 by the S. A. E. formula, but claim is made by the company that they will develop 60 horsepower by brake test, which is more than 100 per cent. excess of average capacity.

The cylinders are cast en bloc from semi-steel with the water jackets integral, the jackets extending the full length of the expansion chamber. The crank case is made in two sections, the upper half carrying two transverse vertical central webs for the center main bearings and having forward and rear extensions, the former to house the timing gearset and the latter forming the bell housing. The lower half of the crank case is pressed steel, this being the crank chamber and the oil reservoir is under the horizontal pressed steel plate that extends the full length and width of the section. The ends of this section are formed to complete the timing gear and the flywheel housings.

Crankshaft a Four-Journal Type.

The crankshaft is a four-journal type, the crank pins being divided into groups of two between each main bearing. The crankshaft is counterweighted and balanced and it is heat treated to afford maximum strength. The pistons and the connecting rods are extremely light, the reduction of weight being to minimize vibration. The valves are contained in removable cages in the top of the head, and the spark plugs are in right side. The valves are actuated by rocker arms mounted on top of the cylinder block. The long push rods are at the right side of the engine and they are operated by roller type tappets mounted in renewable guides.

The push rod springs are contained in cages enclosing the tappets, so that they are removed from the extreme heat of the cylinders. The upper ends of the push rods are fitted with adjusting nuts. The rocker arms are fitted with oil cups and the oil passes from these to the centers of the hollow shafts. The hollow shafts contain felt cores and wicks extend from these cores to the sockets in the ends of the arms into which the ball ends of the push rods seat, adequately lubricating them. Statement is made that one filling of the oil cups of the rocker arms is sufficient for a normal season's driving, and for that reason the valve mechanism requires practically no attention.

Valve Mechanism Fully Enclosed.

The push rods are enclosed by a large plate seated on lugs and retained by studs that practically covers the right side of the engine, and at the top of this is a pressed steel cover retained by wing nuts that afford access to the spark plugs and to the adjusting nuts of the push rods. The rocker arms are housed by a pressed steel cover that is secured by studs and is practically dust and water tight, and this protects the valve mechanism from abrasives as well as silencing the valve action. This cover need only be removed for grinding valves or very infrequent filling the oil cups of the rocker arms. One will note that the wearing parts of the engine are very carefully protected.

The engine is cooled by a circulation of water through the cylinder jackets, forced by a large centrifugal pump by an outside shaft from the timing gearset, by a cellular type radiator and by a large fan carried on the timing gearset housing on a ball bearing on an adjustable bracket that is driven by a flat belt from a pulley on a forward extension of the camshaft.

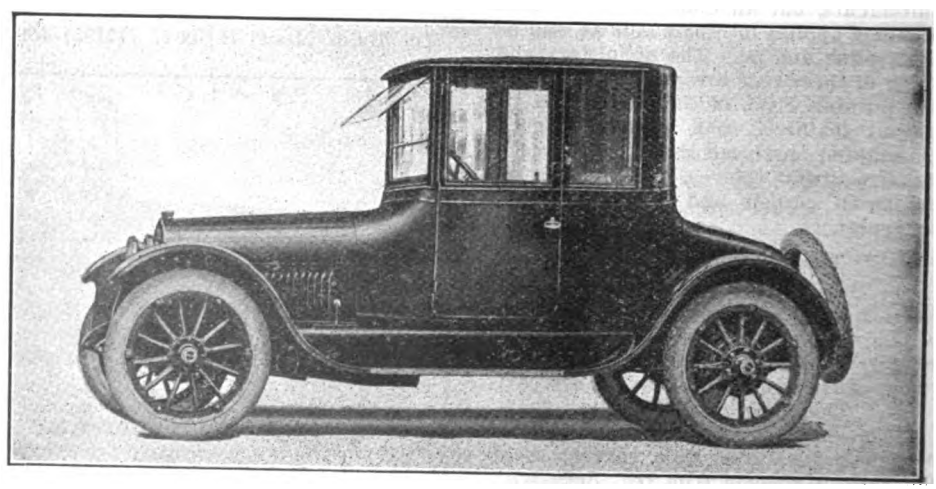
The Buick Lubricating System.

The engine is lubricated by a constant level splash system, the oil being drawn through a filter screen at the pump intake by a gear pump driven helical gears by the camshaft and forced in part through the sight gauge on the instrument board, and in part through ducts, to the troughs in the base of the crank chamber, whence it is distributed by splash of the crankpins to the cylinders, pistons, wristpins, cams and valve tappets. The drainage is trapped in pockets that supply the main, camshaft and timing gearset bearings. The excess oil drains to the oil reservoir. There is a indicator of the oil pressure by which the functioning of the system may be observed. There is a petcock gauge by which the height of the oil in the reservoir may be determined.

Delco Single-Unit Electric System.

The engine is equipped with a Delco single-unit ignition lighting and starting system, there being a generator that charges a secondary battery by which the lighting current is supplied and from which the current for ignition is drawn. The power for starting the engine is also drawn from the battery, generator serving as a motor. The generator is at the right side of the engine and is driven by an extension of the water pump shaft, to which it is coupled, and at the rear end is the shaft and pinion that meshes with the ring gear on the circumference of the wheels. The generator is a third brush type. The distributor for the ignition system is mounted on the front end of the generator housing. This has both manual and automatic advance.

The clutch and the transmission gearset are assembled as a unit power plant with the engine, and the assembly is suspended at three points in the chassis frame to minimize the effects of chassis distortion and vibratory stresses. The clutch is a multiple disc dry plate type, that is completely enclosed and which is lubricated by two grease cups placed outside of the case. The clutch is fully adjustable for wear. The release collar is



Buick Model H-Six-46 Four-Passenger Coupe.

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fitted with a large ball bearing. The transmission gearset is a selective sliding gear type that has three forward speed ratios and reverse. The gear and shafts are large and of special heat treated steel, and the shafts are mounted on annular ball bearings.

The main driving shaft is coupled to the main shaft of the transmission gearset by an enclosed universal joint that is supplied with lubricant from the gearbox, and the shaft is housed in a tube secured to the central section of the rear axle housing. The rear axle is a full floating type. The bevel gear differential gearset is mounted on taper roller bearings and the wheels are mounted on double-row annular ball bearings carried on the outer ends of the axle housing. The pinion shaft is mounted on single and double-row annular ball bearings. The driving pinion and master gear are helical cut and are extremely quiet.

Frames and Other Detail.

The frame is constructed of pressed steel channel section, cambered at the rear end to obtain spring clearance, and it has four cross members that are strongly reinforced and gusseted. The supports for the gasoline tank are constructed with the frame. The frame is suspended on semi-elliptic springs forward and the rear end is carried on full floating cantilever springs. The front axle is a drop forged steel I section with double heat treated integral yokes, steering knuckles and tie rod. The wheel spindles are fitted with taper roller bearings.

The wheelbase of the H-Six-44, H-Six-45, H-Six-46 and H-Six-47 chassis is 118 inches and of the H-Six-49 and the H-Six-50 chassis is 124 inches. The wheels are artilery type, of wood, with large hub flanges, fitted with demountable rims and are shod with pneumatic tires, those of the first four models specified by 33 by four inches and of the last two 34 by 4½ inches.

The steering gear is a semi-irreversible split nut and worm type, with a large adjustable thrust bearing to compensate wear. The steering column is at the left side and the control is by foot pedals for the clutch, service brake and the starting motor, hand levers for the ignition system and fuel supply on the steering column hand wheel, and hand levers for the emergency brake and changing gears. The brakes operate on the rear wheels, the service brake being an external contracting type and the emergency brake external expanding. Both sets of shoes and the linkage are fully adjustable for wear.

Tops and Other Equipment.

The tops of the open bodies are a special type, clamping direct to the windshield when extended, and these are made of a fine waterproof fabric. These have inside operating curtains, with full wing dust covers and clamp type top holders. The closed bodies have door windows that are adjustable to any height. The windshields of the open cars are rain vision, ventilating types, with adjustable friction stops to hold the glass in any position. The windshields of the closed bodies are three-piece, storm proof, ventilating type.

The cars are equipped with double bulb head lamps, tail lamps, combination electric instrument board and trouble lamp, speedometer, motor driven electric horn, tire carrier with extra demountable rim, jack, pump, tire repair kit and complete set of tools.

The prices for the machines are $1495 for models H-Six-44 and H-Six-45, $1985 for model H-Six-46, $2195 for model H-Six-47, $1785 for model H-Six-49 and $2585 for model H-Six-50. All quotations are f. o. b. Flint, Mich.

PORTAGE RUBBER CO. HAS BIG YEAR'S BUSINESS.

Following a most successful business year, the Portage Rubber Co. stockholders at Akron, O., re-elected the directors and officers. A condensed statement made after taking inventory Nov. 30 shows:

ASSETS.	
Cash on hand and in banks...	$255,661.21
Notes receivable.....	36,928.79
Accounts receivable.....	382,098.36
Inventory (raw stock—in process—finished)	1,744,964.68
Real estate, buildings and equipment	1,103,425.43
Trade marks, patents and good will	411,707.04
All other assets.....	13,044.58
Total.....	$3,947,830.09
LIABILITIES.	
Notes payable.....	$250,000.00
Accounts payable.....	126,434.52
Reserve funds.....	246,074.76
Capital stock preferred (authorized $5,000,000).....	520,200.09
Capital stock common (authorized $5,000,000).....	2,500,000.00
Surplus	305,120.81
Total.....	$3,947,830.09

WINTON OFFICERS RE-ELECTED FOR THEIR 23D YEAR.

The same officers who have served the company since its incorporation in 1897 were re-elected at the annual meeting of the Winton Co., Cleveland. They are: President, Alexander Winton; vice president, Thomas Henderson; secretary-treasurer, George H. Brown. They and the following were elected directors: Z. W. Davis, Irving W. Metcalf, Charles W. Churchill and Charles W. Mears.

AMERICAN BELL AND FOUNDRY CO.

The American Bell and Foundry Co., Northville, Mich., at its annual meeting elected these directors: Frank Harmon, president and manager; Charles Filkins, William Phillips, R. C. Yerkes, Charles Coldren, F. S. Neal, R. Christensen and Spencer Clark. The company makes steel alloy bells and furnaces and employs 50 persons.

AJAX RUBBER'S NET PROFIT $3,100,979.

The Ajax Rubber Co. made sales amounting to $20,228,112 during the first 11 months of last year, with a net profit of $3,100,979. The surplus, after deduction of charges is $2,461,979. Total assets and liabilities for the 11 months were $13,023,759.

UNITED AUTOMOBILE INSURANCE CO.

The United Automobile Insurance Co., Grand Rapids, Mich., at its annual meeting, re-elected these officers: President, Edward P. Whitney; vice president, John H. Seabrook; secretary-treasurer, James K. Miller; directors, the officers and John A. Higgins, Frank G. Mathison, Glendon A. Richards, John Wood, W. B. S. Matheson, Frank S. Elston and S. J. Barkwell.

The company was organized on a mutual basis. In September it incorporated with $100,000 authorized capital, of which $42,000 has been paid in. Policy holders are also holders of the stock.

BOOST PEERLESS CAR PRICES.

A revision upward has been made in the prices of Peerless passenger cars. The seven-passenger touring and the four-passenger roadster are now listed at $2760, having formerly been $2550. The four-passenger coupe sells at $3320, instead of $3050. The seven-passenger sedan has been increased from $3250 to $3530. The seven-passenger sedan-limousine now sells at $3720, or $30 more than the former price.

AUTO BODY CO. MAY CONVERT PREFERRED STOCK.

At the annual meeting of the Auto Body Co., Lansing, Mich., it was announced that the Michigan Securities Commission had granted the privilege of converting the company's preferred stock into common stock at any time within the next three years. These officers were elected: President, F. N. Arbaugh; vice presidents, E. H. Thomas, W. V. C. Jackson; treasurer, E. S. Porter; secretary, F. C. Ruch.

NOT TO CUT AUTO PRICES.

Most of the automobile manufacturers have announced that they do not expect to lower present retail prices for some time to come, the causes which led to the general advance in price not having been removed.

NEW SALES MANAGERS.

The W. D. Block Motor Co., Detroit, distributor of Marmon and Oakland cars, has appointed E. S. Hilton sales manager for Marmon cars and George W. Reason sales manager for Oakland cars.

HUPP PRICE LOWERED.

The Hupp Motor Car Corporation, Detroit, has reduced the price of the Hupmobile $165, making it $1335.

No show will be held by the Automobile Dealers' Association in Kalamazoo, Mich., this year.

The Ford garage in Kalamazoo, Mich., destroyed by fire two years ago, will be rebuilt as a fireproof structure.

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PLATE IV.

BRICK GARAGE FOR THE HOUSING OF ONE CAR

Snappy Substantial, Structure Designed for Wall Units of Rough Texture, Flemish Bond Pattern and With Asbestos Shingle Roof.

Designed by the Architectural Department of the Automobile Journal Publishing Co.

Plate IV of the series of garage designs made by the Architectural Department gives the plans and valuable detail for building a private garage of brick and fire-resisting construction. This plan presents another ideal shelter for the automobile, more than comparable with those already published in this special series, and more of which in private garages, commercial garages and service stations follow. Builders' estimates and details are readily procurable on application.

APPEARANCE and construction are important points in garage building. To be substantial, neat and able to withstand the ravages of time, a garage must be built of lasting materials, and so brick has been selected for the construction of the garage shown in the accompanying drawing, a private garage for housing a single car. In general appearance this garage is snappy, carrying a mark of distinction that would beautify any estate. It is especially suitable for the owner who takes pride in the care and upkeep of his car, and wishes the facilities at hand to insure that this shall be done.

This garage of the one-car type is spacious and well lighted. It has many novel features, completeness of detail and special advantages in spacings and equipment. The size is nearly 18x22 feet, giving ample room for the housing of a car of the largest touring type.

The sub-structure, or foundation, is concrete, in the construction of which, to get the best results, pains should be taken to see that the concrete is properly mixed and poured in forms of suitable size. No less care should be exercised with the foundations of a garage, it may be said, than would be observed in a larger or costlier building. As to the depths of foundations opinions vary. Those shown, however, are three feet six inches deep, ample to take care of a building of this size. If these foundations are made with a good mixture in the proportions of one quart of a good Portland cement, three parts sand and five parts coarse aggregate, the sub-base will amply carry the weight of the superstructure and be sufficiently dense to withstand any action of frost.

The superstructure, which is of brick construction, has solid walls, and a wood-timbered roof covered with asbestos shingles. The trimmings are of wood, and, by way of external ornament, the design includes a wrought iron lamp bracket over the portal. To get the desired effect of the designer a brick with a rough texture should be used, and it should be laid in the Flemish bond pattern, having a joint not less than five-eighths of an inch thick to be struck flush with the brick.

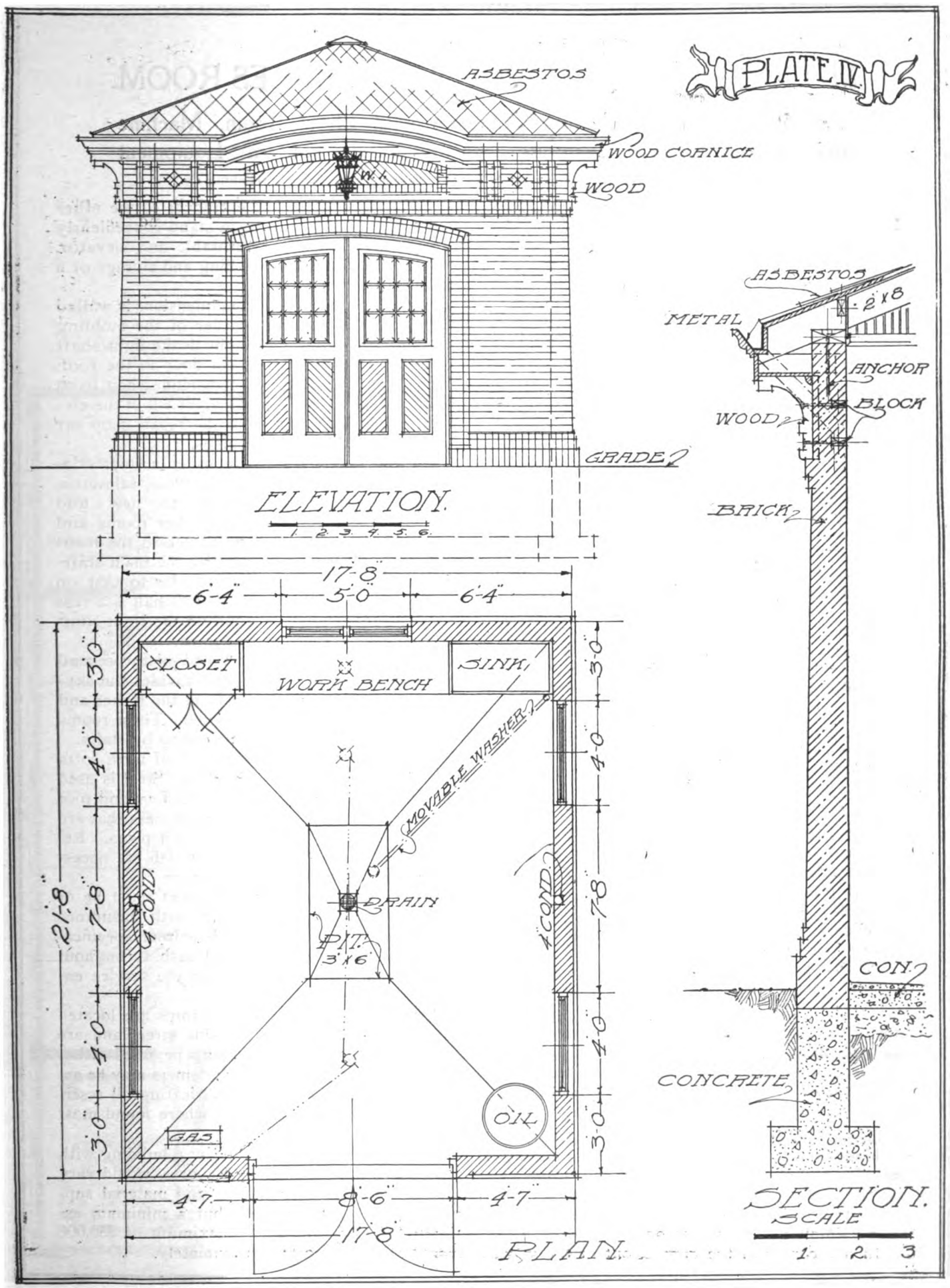
The roof timbers are of 2x8 inch spruce, covered with a seven-eighths boarding, or roofers. Five-ply tar paper is recommended as a bedding for the asbestos shingles. Artistically, these shingles give a striking effect when laid, as shown in the front elevation, in the diamond pattern. They may be obtained in the general market in several colors, and green or gray are recommended as good combinations when used in connection with red brick walls. The roof is drained by two four-inch conductors, one on each side of the building, placed equi-distant in the wall.

Special attention has been given to the lighting of this garage. The windows are spaced so that no matter what part of the car a man may be working on when it is placed over the centred pit, the light is the same, by plan. This principle also aids from a standpoint of ventilation. The lighting of the garage by night is as shown, several electric outlets being placed at points of vantage. The light switch is handily placed at the left of the entrance, just within the door.

Many advantages are secured in the arrangement of interior equipment. Along the rear wall is a work bench, placed in a well lighted position immediately under the window, while at the left there is a handy closet, closed with double doors, in which tools and supplies may be kept. From the water connection at the sink, on the right of the work bench, a movable washer arm extends pitward. This is a uniquely designed fitting, which, by its elevation, allows of the washing of the car, with convenience and dispatch, by the use of only a short hose length the operator being able to direct a stream easily on all sides of the car.

In this design it is taken into consideration that heating, as a rule, is capable of being furnished from the main plant in the house. A special heating plant would, of course, mean added expense and no better results, in all likelihood. Wall radiation is the most practical, the pipe system being commonly used. Due to labor and fluctuations in prices of materials, it is fair to say that this garage may be built for approximately $900, exclusive of heating.

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PLATE V.

MODEL SERVICE STATION AND SALES ROOM.

Two-Story Fireproof Structure Complete with Show Room, Machine and Repair Shops—Generous Spacings and Modern Equipment

Designed by the Architectural Department of the Automobile Journal Publishing Co.

THE accompanying plans offer a suggestion for an ideal automobile building to be used by an up-to-date, progressive dealer, and its arrangements permit of its use for practically every branch of the trade in which he can conveniently engage.

Facilities are provided for handling the agency for one or two new cars, and the appointments are such that the dealer may handle used cars and take live or dead storage. Space is also provided for the care, renovation and repair of cars. In fact, an examination of the plans will reveal that a careful survey has been taken of the progressive dealer's requirements, which has been taken into consideration in the design offered.

Having provided for all the practical needs of such a structure, the architect has taken into consideration the value of nice appointments where customers are received and accommodated in addition to providing a suitable facade, which is valuable as an advertising feature, a fact testified to by the thousands of dealers throughout the country who have gone to considerable expense in having highly decorative fronts erected to their buildings whenever their means would warrant it.

This structure, of course, is primarily for a dealer in a fairly large city where business would pay for its erection, maintenance and a profit. It is designed to go on a corner lot 50x100 feet. On the ground or first floor plan is an entrance vestibule, leading off the main street. To the right of the entrance is the show room, where several cars may be exhibited and an accessory case set up with other stock displayed in glass cases on the walls. On the left side of the entrance is the office, which has an entrance leading into the garage floor and shops.

On the side street there is a service door leading directly into the garage and in front of the turn table. This arrangement enables the operator of the car to turn his machine in any direction and run it to any position in the garage, onto the elevator or into the repair shop. The latter room is fitted with two repair pits, although there is sufficient room to handle three cars at a time or possibly four.

Manouvering cars about inside of a building has always been found a troublesome problem, but the arrangement given in these plans, in relation to the layout of the building, seems to offer a simple and easy solution.

In one corner of the garage, out of the way of the passages from the entrances to the other points in the room, is a wash stand conveniently located near both the turntable and elevator, thereby facilitating the washing and storage of a car with little trouble.

A machine shop of ample dimensions is walled off in the rear left hand corner of the building and lighted by a huge skylight in the light shaft extending through the second floor to the roof. There is an entrance to the machine shop from the garage; also one to a passage back of the elevator, which leads across to the repair shop for the convenience of the machines.

On the second floor are toilet accommodations for customers, office employees, salesmen, a large floor area devoted to new and used car storage, supply and locker rooms and toilet for the employees. Entrance to the front of the second floor is reached by the main staircase, which leads into a hall similar to that on the first floor. To the right of this hall is a rest room and toilet for ladies and on the right similar accommodations for gentlemen.

In the centre of the rear end of the second floor is the elevator well, which divides the skylight over the machine shop from the locker and supply rooms and employees toilet. These rooms may be reached from the repair shop by stairs.

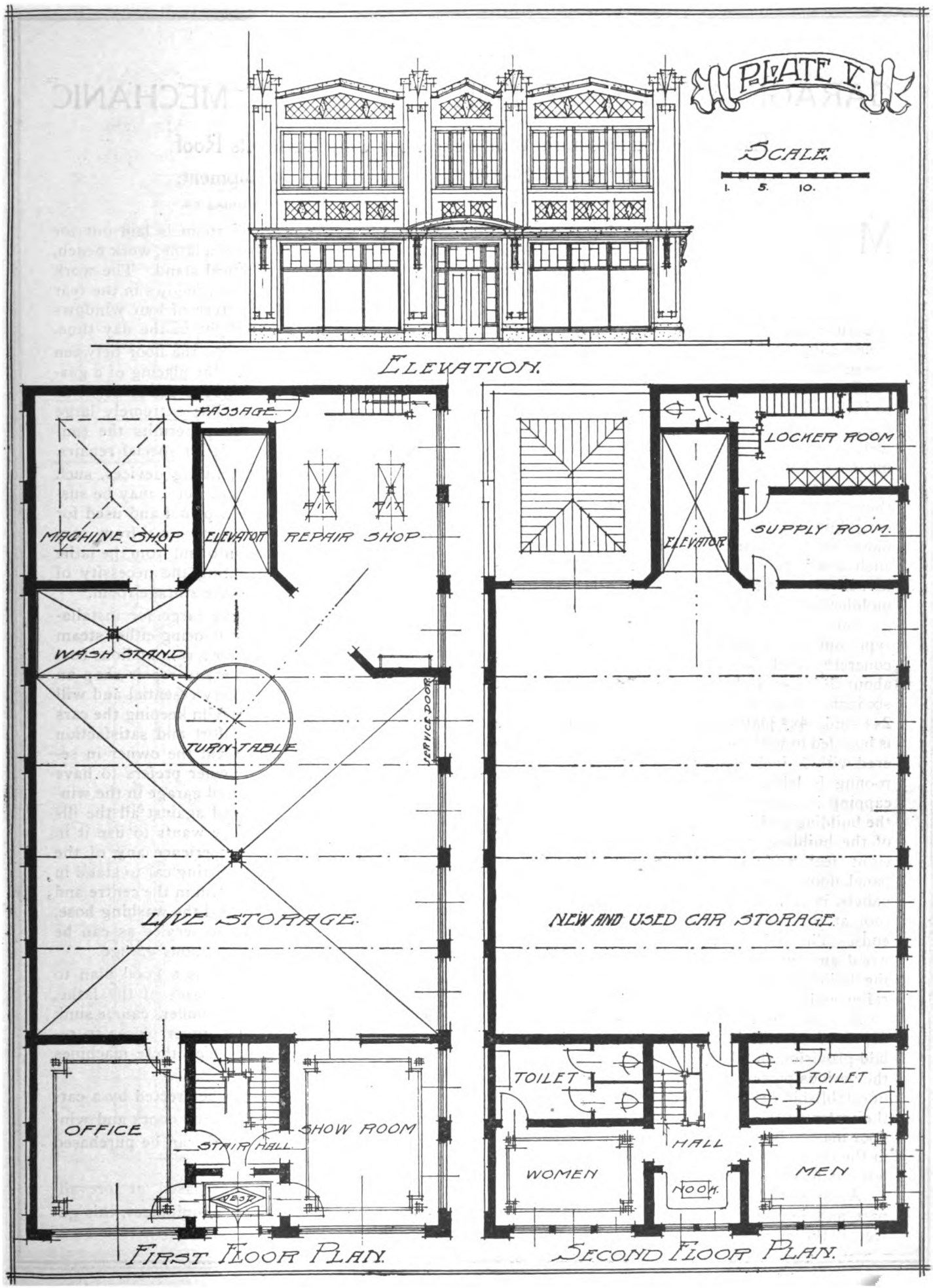
The exterior of the building is of terra cotta with tile inlay, backed with brick. Steel is used for the frame, large girders in the floor and roof supported on steel "H" columns in piers that are spaced as shown by dotted lines on plans. Reinforced concrete floors and roof slab are necessary to make it a fireproof structure.

Lighting and heating equipment must be of standard make and complying with insurance underwriters requirements. Fireproof specifications would also include steel sash throughout and an automatic roller door at the service entrance on the side street.

The gas tank and service pumps are located outside the entrance on the side street and are connected up so that cars may be filled either from the inside or transient customers may be accommodated at the curb. Lubricating oil reservoirs or tanks may be placed where found most convenient.

The construction cost of such a building with all modern improvements, of course, would vary according to labor conditions and material supplies in different localities, but a minimum estimate of $25,000 and a maximum of $30,000 would cover the costs approximately.

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PLATE XI.

GARAGE WITH SHOP FOR THE HOME MECHANIC

Easily Erected Structure Will Take Four Cars Under Its Roof and Has a Separate Section for Repairing Equipment.

Designed by the Architectural Department of the Automobile Journal Publishing Co.

MANY motorists with a mechanical trend of mind have cherished in their hearts a wish for a little garage where they have their own repair shop and do all their own work, as well as a little on the side for neighbors. Such a structure can be erected much cheaper than one would suppose, and the one made the subject in the architectural department this issue provides ample space for four cars, enabling the owner, if so inclined, to secure a sufficient income from his investment to pay for housing his own car, as well as interest, and also the overhead for his machine shop.

In small communities, or in the suburbs where there is considerable work for a mechanic on cars, but not sufficient to warrant the maintenance of a permanent repair shop and garage, such a structure with its equipment is an excellent investment for the man who can repair automobiles for himself and others.

The building is of a permanent substantial type, but not costly to erect or maintain. On a concrete foundation 33x25 feet, set in the ground about 3½ feet and extending above level about six inches, a wooden frame is erected of 4x6 sills, 2x4 studs, 4x4 plates and 2x10 rafters. The frame is boarded in with novelty siding and the roof covered with ⅞-inch boarding on which a Rubberoid roofing is laid. A brick chimney with cement capping is shown. This rises at the rear end of the building and from the boiler room. The front of the building, containing two openings, each eight feet wide and closed with two swinging panel doors set with window sashes in upper panels, is carried up above the peak of the main roof at the centre and is shouldered off to the ends. The false part of the front is made of wood and put on to improve the appearance of the building, as is also the girting and sawed rafter ends.

A concrete floor is laid at grade and for a depth of several inches below and before it is laid provision should be made for the entrance of the various pipes and conduits that are necessary in establishing the drain and feed connections for the water and lighting systems. The base of the floor may be laid of the same coarse mixture used in the foundation walls, but it should be surfaced with at least an inch of smooth cement.

A closet and sink are installed in the garage part and in the rear, occupying a space 12x16 feet, is the machine shop, boiler room and toilet. As shown by the plan the room is laid out for the convenient installation of a lathe, work bench, upright drill and emery wheel stand. The work bench sets beneath the three windows in the rear and the lathe under the battery of four windows on the side giving ample light in the day time.

Ample space is allowed on the floor between either wall and the lathe for the placing of a gasoline engine for power, or above the lathe when an electric motor is used. The extremely large entrance to the machine shop permits the running of an automobile into it for special repairs.

With this arrangement, lifting devices, such as chain falls, block and tackle, etc., may be suspended from the machine shop roof and used for removing engines and transmissions from cars and for lifting heavy parts into and from the lathe and drill press, thus obviating the necessity of having similar apparatus in the storage room.

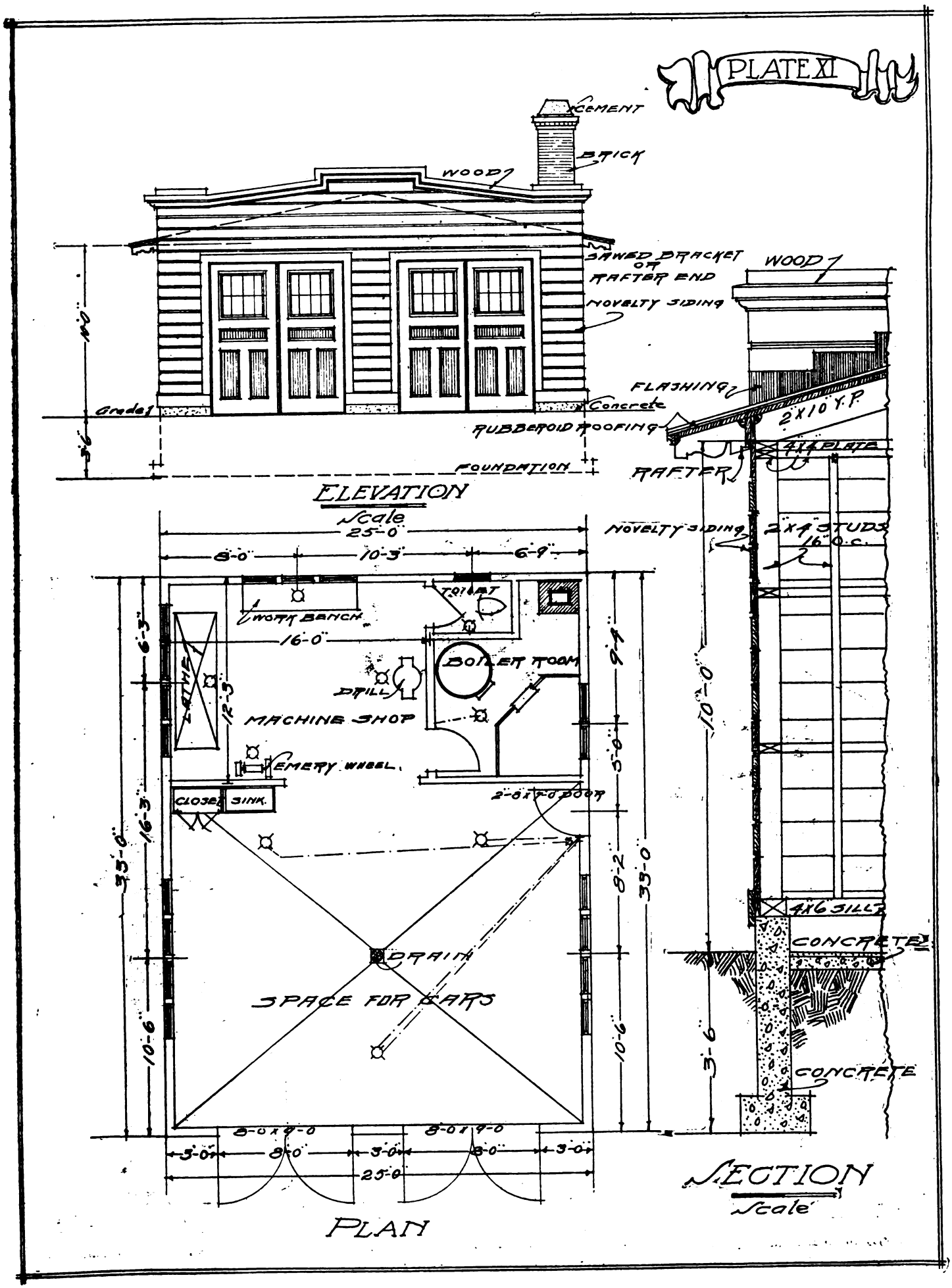
The boiler room is amply large for installation of a small heating system, using either steam or hot water, and provides for a commodious coal bin. For a practical garage and repair shop an efficient heating system is very essential and will pay for itself many times over in keeping the cars in order, as well as in comfort and satisfaction to the owner. It will also aid the owner in securing customers, as any owner prefers to have his car in a comfortably heated garage in the winter, as he knows it is secured against all the ills of freezing and that when he wants to use it in the morning he will not experience any of the troubles resulting from permitting car to stand in low temperatures. With a drain in the centre and an overhead water pipe to feed the washing hose, the owner can give the same service as can be obtained from the most pretentious garage.

When casting the floor it is a good plan to have the dimensions of the bases of the lathe, emery wheel and drill so that timbers can be sunk into the wet cement in the proper places to receive the lag screws with which these machines are held in place.

The entire structure can be erected by a carpenter and mason, excepting the doors and window frames and sashes, which can be purchased cheaply from a supply house.

With the materials purchased at prevailing prices and excluding the equipment, this garage may be erected for $350 to $400.

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Peace Time Modes for Motorists

Fashion's Recent Creations for Women

By Mrs. A. Sherman Hitchcock.

WHEN the mightiest conflict that the world has ever known needed the services of the American woman, she threw off her silks and satins, donned the khaki uniform, overalls, or whatever costume best fitted the work she was assigned to and proved herself efficient in a varied line of workmanship.

During the period of the war about 30,000 women kept as many motor ambulances, supply trucks and other types of motor vehicle in operation. They did not simply drive these motors, but they did the repairing, washing and cleaning of them. There were many stations where the duty of one woman was to clean eight cars a day, while other women did all the mechanical repairing. Now that peace has been declared, America's daughter steps from her somber attire into the most charming new styles that have been seen in many a day and motoring again becomes a pastime.



A very new model of fiber silk sweater coat which has good lines and smart simplicity. This new weave may be had in all the newest and best colors.

Courtesy Standard Knitting Co., Cleveland, O.



A wrap suited for the theater or evening party; a beautiful model of Panamerie, trimmed with ermine.

Courtesy Sidney Blumenthal & Co., New York City.

Long lines of motor cars were driven southward this year and when the doors of the Royal Poinciana at Palm Beach opened and the myriads of lights twinkled from windows and corridors said to be the length of nine city blocks, and the curtain of fashion was raised for the season of 1919, the motorist was present in far greater numbers than ever before in the history of the American style center. No resort in America is more cosmopolitan than Palm Beach. Here gather sojourners from every part of the Union, and while dollars are represented ad libitum at the hotels there is apt to be a rather heterogenous assortment of costumes, many of them dating back several vintages behind the more up-to-date cities. Those who know and know that they know, and those who do not know and know that they do not, all seek the latest in motor fashions, and it is at Palm Beach that the motoring styles are launched that will appear in the North a little later.

This is the time of year when the motor woman is planning her outfit for the coming spring and summer and the subject of new models and new materials is of the greatest interest to her.

Coats a Comfort Giving Type.

The new motor coats are of the comfort giving type, combined with smart and snappy style and attractive materials. The majority are full length, although some models are seen about seven-eighths length. There is a strong leaning toward the mantle type of coat, but the regulation coat style is in the lead. The new collars are a very important feature and there is a new blousing back panel that is being introduced with success. The free armhole is on the majority of new models, but there are also coats showing the normal armhole and regulation coat sleeve.

One of the most important parts in the designs of the motor coats are the pockets. Buttons are to play a very important role in the fashions of the season and the majority of garments close with buttons and button holes. Pocket flaps button together, and sleeve trimmings include to a large extent the button and button hole idea. Self toned buttons are generally used, although the note of white is sometimes introduced by using buttons of composition or pearl.

A Greater Diversity of Fabrics.

Motor coats are developed in gabardine, burella, tweeds, ratine, broadcloth



The charming Peacetide Veil that may be adjusted in several ways to suit the particular occasion and adds much to the motoring costume.

Courtesy Hydeman & Lassner, New York City.

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A motor scarf made of silk jersey and Kismet silk and adorned at one end by a large tassel. The hat is also of Kismet and has for trimming a red buckle.

Designed by Jane March, New York City.

and lightweight velour as regards the wool garments, while there are the most attractive models in the new heavy silks —such as Dew Kist, Kumsi-Kumsa, Amphora and Roshanara, and the heavy satins are used to excellent effect. For the ultra smart motor coat there is nothing which gives a more beautiful or rich effect than the Waterfall Panamex and Waterfall Panameric. These materials are glowing, lustrous velvets of original and exclusive weave, which may be had in all the newest and most charming colors.

A coat of mignonette Panamex has a deep yoke which runs to a point at the back and also over either bust, and from this yoke the full sweeping garment hangs in straight folds and is finished at the bottom in an uneven hem line. A small motor hat made of the Panamex accompanies this coat. This hat is almost a replica of the Manchurian head dress, the trimming consisting of a full pompom of gold colored silk placed at the top center crown, where in the Mandarin headgear, a tiny button appears. Panamex and Panameric are among the decidedly modish materials that appear in many garments for the motor woman. There are the most attractive frocks which will do duty upon the most important occasion, and for the sweater coat nothing could be smarter.

Dolman Wrap Continues Popular.

The popularity that the motor cape, or dolman wrap, gained last season marks it for one of the leading spring styles. The new models differ from those of last season but slightly. They are made of many materials, according to the warmth one wants and the use to which it is to be put. Light weight woolen materials, silks and the heavy satins are all employed for this use. Fringe that is but two inches wide is applied on many of the new cape models, edging the wide cuffs, the stole collar and the bottom of the wrap. Fine soutache braid is strongly in evidence as trimming and embroidery in two-tone effects, as, for instance, light and dark blue on a Copenhagen cape is a notable feature in trimming.

The Vogue of Furwove Nutria.

The lovely Furwove Nutria is a material which is becoming very popular with the discriminating motor woman and there are some stunning capes and scarfs of this material. A cape of Furwove Nutria is shirred on to the neckband in the back under the collar and again a trifle over the shoulders at each side, producing a narrow old time effect, which is delightfully quaint, and it is quite wide at the hem.

This material is as soft as the finest velvet and lends itself wonderfully well to manipulation. In color nothing could be better for motor wear, as it will not show soil or dust. It makes the ideal scarf for the entire summer, for when the cool evening breezes spring up the scarf of Furwove Nutria will give just the requisite comfort that the car occupant desires.

Lined with a charming printed Pussy Willow in gay design, and with one of the very large silk tassels at one end—while the other is left plain, a scarf of this character combines the practical and artistic and may be easily made at home. Straight line coats of Furwove Nutria are to be strongly recommended for motor wear for the whole year round and to carry one in the car will not be amiss. The wearing qualities of the material are so wonderful that the hardest kind of motor wear fail to deteroirate it.

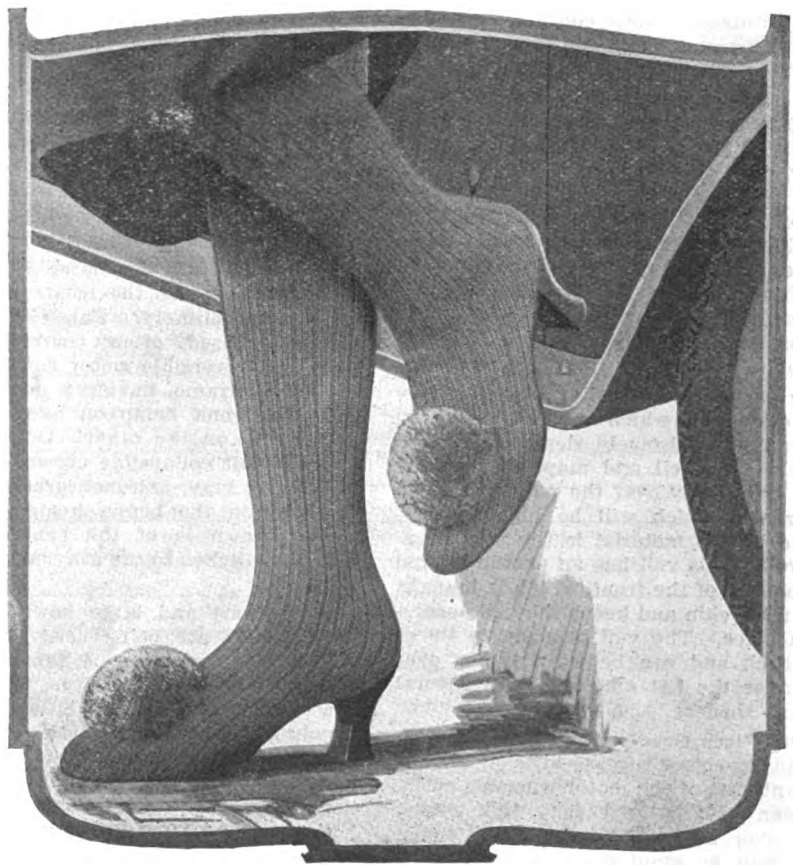
The motor scarf of silk is the newest accessory and very charming it is. These scarfs are very long and wide and may be used the same as a shawl. Pussy Willow satin, Indestructible Voile and Kismet—a new plaid silk of rough weave, are particularly good for motor scarfs. Kismet is also employed for suits and coats, usually combined with a material of plain color. It is also seen in the modish millinery, both used alone and with fancy straws.

Sweaters Vie with Rainbow.

The palette of a cubist artist never held richer hues than are seen in the new sweaters and sport coats. Shades of pink, rose, cerise, blue, purple, orange, henna, tan and brown vie with one another in sweaterdom, and are to be seen in both silk and Shetland. A handsome silk sweater in henna shade is notable for its deep self-fringe that brings it below the knees in length. The neck is V shaped and collarless, but a long chain of large henna colored beads set between black accompanies it and adds the ultra smart touch. Both the sleeved garments and those of sleeveless type are in good style and the weaves are varied and charming, coming in the jersey weave, in stripes, block dominos and checked patterns. A checked effect is seen which is given by lines of contrasting chain stitching that cross and recross to form a rather large check.

Veils Worn with All Hats.

From a motor standpoint veilings are to have exceptional opportunities this spring. All motor hats are small and



These splendid wool Motorhose may be quickly donned or removed, obviating a change of footwear for the motor ride. Motorhose come in several attractive colors and have a sole of kid, with an opening at the heel through which the shoe heel slips. A self-tone wool pompom adds to their appearance.

Courtesy F. A. Patrick & Co., Duluth, Minn.

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This chic turban is of red taffeta and indestructible voile, having the novel La Victoire design. The scarf may also be used as a veil.

Designed by Harry Collins, New York City.

their general character is especially favorable for the use of the veiling accessory. Moreover, women of fashion are showing unusual preference for the veil and veilings are now considered almost an indispensable adjunct to the modish motor outfit.

In motor veils the yardage veil is steadily increasingly in favor. A new scarf veil has a wide, shaped section for wear over the face, with long, narrow ends which cross in the back and are draped or tied about the throat or shoulders. In color the most fashionable shades are copper, tete de negre, bronze and henna. The staple browns and taupes are also very good. Many of the motor veils are bordered with a design in flat silk braid.

An especially modish veil is the new Peacetide Veil, which is a net having an unusually handsomely designed border. It is a long veil and may be arranged very artistically over the motor hat. Another veil which will be highly appreciated by the motorist is the new Kum-Fit veil. This veil has an elastic around the bottom of the front, which is brought under the chin and keeps the veil securely in place. The veil is made to tie at the back and can be worn either over or under the hat and comes in several modish shades.

One-Piece Gowns in Every Fabric.

The one-piece dress—always an important part of the motor woman's outfit, is seen in greater variety this season than ever before. All the smart rough silks will be employed largely for this purpose, and the leaders are Ruff-A-Nuff, Amphora, Dew Mist, Kumsi-Kumsa and Khaki-Kool. Cotton fabrics will be strongly used and they answer the purpose of the motorist to perfection during the warm weather. The Devonshire cloth and Nu Vogue are charming in their new patterns, which embrace both plain colors and most harmonious combinations.

The Nu Vogue plaids are very artistic and considering their splendid wearing qualities are sure to find favor with the knowing motorist. Made in the tunic style, with a long-waisted belt effect, these materials are most becoming to both the slender and full formed figure. They possess the advantage of not showing soil readily and are inexpensive—two features which appeal to all women.

Ribbon Hats for Motor Wear.

Ribbon hats are the most popular of all motor millinery. Fabrics are also plentifully used, often combined with straw. A reversible motor hat is entirely without frame, having a double brim showing henna hemp on one side and gray hemp on the other. On the gray side the soft collapsible crown, which is of pleated, gray, half-inch gros-grain ribbon and on the henna hemp side, the ribbon crown is of the henna ribbon, which is stitched to the gray on the other side.

Very smart and large bows made of faille ribbon are being used on helmet turbans for motoring. A brown helmet turban of lisere has a large, four-looped bow drawn through the crown tip and standing wide on either side. Just what effect this style would have in a gale of wind is hard to say, but it has the sanction of fashion.

A novel and most attractive little motor hat, made entirely of ribbon, has a very short back brim, with the ribbon of the tip radiating to the edge and the crown sides made of a soft crush of the ribbon. The little brim is the interesting feature displaying the two-inch satin ribbon radiating from the crown base to the edge, where it turns up tightly in a little roll that lays on the upper brim.

The effect of all these ribbons is one of a broken brim edge and is very smart and new. Many motor women can make these smart little ribbon motor hats at home and have several different styles and colors for about the price of one purchased at a smart shop. There is no ribbon which can be used to better advantage for this particular kind of work than the excellent Regatta ribbons, which are of a high grade and can be manipulated beautifully.

LIBERTY DISTRIBUTORS.

A. C. Miller, vice president of the Miller-Judd Co., Detroit, distributor of Liberty motor cars, is again selling automobiles after 20 months in the navy. He enlisted as a seaman and was later commissioned as an ensign.

The Harrisburg Auto Tire and Repair Co., Harrisburg, Pa., Liberty distributor, has appointed Fred Vickery as sales manager. He was formerly sales manager of the Cadillac-Hinton Co. of that city.

J. Howard Velott, a former Liberty dealer and salesman, has become sales manager of the Media Garage, Pa., which handles the Liberty.

DE PALMA'S GOODYEAR TIRES SHOW NO WEAR.

The Goodyear straight side cord tires, with which De Palma's car was equipped when he broke world's records at Daytona, Fla., showed no wear after the thrilling race, and they will be used again by De Palma in other races, the Goodyear Tire and Rubber Co. announces. "Cliff" Durant, son of F. C. Durant, president of the General Motors Co., who will be at all the big tracks the coming year, says he will use Goodyear cord straight side tires.

FORM TIRE COMPANY.

The Record Tire and Manufacturing Co. of New Jersey, Newark, N. J., to deal in auto tires, etc., has been chartered by James H. Cogshill and Frank B. Walter, Morristown, and Harry F. Hartjen, Bronx, N. Y., with $50,000 capitalization.

AUTO, GARAGE AND ACCESSORY FIRM INCORPORATED.

The Malton Corporation, Manhattan, auto, garage and accessory business, has been chartered by R. G. Redlefsen, S. Dinkelspiel and J. J. Tobin, 64 Wall street, New York City, with $500,000 capitalization.

WILL MAKE TOOLS.

Lease Bros. Motor Co., Inc., to make goods, tools and machinery, has been incorporated with $50,000 capitalization by I. Levene, R. and R. M. Lease, 240 West 49th street, New York City.

The New Idea Double Tire Co., Inc., Rochester, N. Y., has increased its capitalization from $2500 to $20,000.

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"WHAT IS BACK OF A GOOD BUYER'S GUESS?"

By Walter Engard.

A VERY prominent credit man just recently said: "If I could stop extravagant, unintelligent buying, I could prevent one-half of the business failures and I could raise one-quarter of all retail merchants from being almost failures to at least a small degree of success." This opinion is general among all the leading credit men of the country. It has also been stated by credit men that for every five dealers who can sell goods well, there is but one who can buy goods shrewdly.

Stocks that go into the store are the food with which the business builds its strength. Your methods of selling, the method of handling customers, of display, of advertising, important as they are, only dispose of that which you buy. Buying is the foundation upon which all businesses are built. Good buying makes a solid foundation upon which to build, while poor buying makes a very poor foundation and eventually will give away and the business will come down in a wreck. The good buyer is the builder of the future of the business, and as surely as time makes days into yesterdays, just so surely the buyer holds in his hand the destiny of your business.

Three Elements of Success.

The three most important elements of success in any retail business depends altogether upon the buying end of that business. These three elements are: First, the volume of sales. The sales are affected by the buying in several different ways. The buyer must be posted on what stock to carry if the store is to secure all possible sales. The buyer must also be posted on prices so that he can secure the very best price in order to meet competition and not lose sales to a competitor because of a higher price. He must know quality in order that the stock handled will give satisfaction and make friends for the business.

Second, the percentage of profit depends on the buying. The buyer must be able to be in a position to demand the best prices in order to secure a larger margin of profit for the store. He must know in what quantities he can purchase certain articles in order to take advantage of quantity prices and to avoid overstocking. He should know the selling possibilities of each article that he handles so that he will not overstock and later be forced to sell at a cut price in order to clean up the stock, for this means lowering the percentage of profit.

Third, the rate of turnover depends upon the buying end of the business. Every good buyer appreciates the value of turnover and he will endeavor to increase the rate for he realizes that profit lies in rapid turnover. He also realizes that goods in stock too long cause a loss to the store, no matter if they are sold at the regular retail price, for he knows that the interest on the investment will soon eat up the margin of profit.

Article _____ Stock No.___ Minimum ____
Description _____ Maximum ____
Best Selling Months _____

PURCHASES						SALES					
Date	Quantity	Date	Quantity	Date	Quantity	Date	Quantity	Balance	Date	Quantity	Balance
						FORM No.1					

Buying Based on Three Factors.

Therefore, the good buyer must have three things in mind when placing an order for any stock. First, the selling possibilities of the article he is ordering. Second, the profit to be made on the article. Third, the rate of turnover he can secure on the article.

We often wonder what is back of a good buyer's guess, but the good buyer does not guess—guess work has proven too fatal. It has been the rock upon which many a business has been run and dashed to pieces. He realizes the importance of buying and has provided his business with records with which he can buy intelligently. These records show him the selling possibilities of every article of stock; he does not guess at such an important factor in the success of his business. His records also show him the rate of turnover he is securing on every article and this eliminates the danger of overbuying.

Buying Most Important Phase of Management.

Buying has always been one of the most important phases in the successful management of any business, but in these days of rising costs, decreasing profits, and the keener competition, together with the coming of peace and the reconstruction period upon us, which is bound to bring about new conditions none of us are able to foretell, makes the necessity of good buying even more imperative than ever before.

Profits begin with efficient buying. No matter how well your goods are displayed, how well they are advertised, nor how efficient and well trained your sales force may be, you cannot overcome the handicap of poor buying sufficiently to operate your business under present conditions with even moderate success.

Efficient buying can only be done through an accurate system of records that will give you the necessary information on each article handled that you may intelligently place an order for that particular article. Efficient buying cannot be done through guess work.

Stock Numbering is Imperative.

Now the first thing the merchant should do to facilitate the handling of these records is to stock number every article in stock. All articles of the same

Article _____ Stock No.___ Cost___
Description _____ Retail___

Year	19—	19—	19—	19—
January				
February				
March				
April				
May				
June				
July				
August				
September				
October				
November				
December				
Totals —				Form No.2

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kind, size, make and price will bear the same stock number, while all different articles shall bear a different stock number. That is, all tires of the same make, size and price can bear the same stock number, while tires of the same size and price, but of a different make, shall bear a separate stock number, or tires of the same make, but of a different size and price, will bear a separate stock number.

The system of stock numbering is of little importance. One dealer will use one method while another will use an entirely different method, but the important feature is to have some method of stock numbering and have all articles in stock numbered. A good method of stock numbering is to precede the number with the first letter of the article, as for illustration in numbering tires, say Goodyear tires, let the letters G. T. precede the number thus: G. T. 3456; in the case of Champion Spark Plugs, thus: C. S. P. 856, etc.

Sales Slips a Part of System.

In the use of this system it is important that sales slips be used and that a sales slip be made out for every sale whether it be for 10 cents or $10, or for cash or on credit. The salesman will enter upon the sale slip the name of the article sold, the stock number and the price received. These slips shall go to the bookkeeper and at the close of the day they are entered onto the buying record.

A "Buying and Stock Record" card, Form No. 1, is to be filled out for every article in stock. Upon this card will be entered the name of the article, the stock number and a brief description. One will also notice that this card provides for entering the minimum and maximum amounts of stock one should carry of each article; this will be secured from the "Sales Summary" card, Form No. 2, which we shall take up just a little further on in the article.

Now at the installing of the system you will take a physical inventory of all stock on hand and enter upon this card under the heading "Purchases," in the column marked "Quantity," the amount of each article you have in stock. When a new supply is purchased and received you will enter the date and the quantity as provided on this card.

Record an Inventory of Stock.

At the close of each day you will total the number of each article sold that day and enter the amount under the heading "Sales" in the column marked "Quantity," and then subtracting the number sold from the number in stock you have the balance on hand at the close of the day. You can very easily check these records to see that they are accurate or that you are receiving a sales slip for every article sold. If your record shows that there should be 42 Goodyear tires, 31 by 4 inches in stock, all you need do is to take a physical inventory of those tires and find if there are 42 in stock.

You will also notice that this card provides for entering the best selling months for each article, this information shall be taken from the "Sales Summary" card, which we will get to shortly.

Records Facilitate Buying.

When you are placing an order for any article you will turn to your records and there you will see just how many you have in stock, also you will note the minimum and the maximum amount of stock you should carry of that particular article and the best selling months for that article, and you will place your order accordingly.

Say you are placing an order for Goodyear tires and turning to your records you find that you have 15 30 by 3½, 25 31 by 3½, 13 31 by 4, 9 34 by 4, 11 35 by 4, and that your minimum stock should be 36 30 by 3½, 50 31 by 3½, 40 31 by 4, 25 34 by 4, 20 35 by 4, and the maximum is 75 30 by 3½, 100 31 by 3½, 100 31 by 4, 50 34 by 4 and 35 35 by 4, and the best selling months for them all are April, May, June, July, August and September.

If it is January and you are placing an order for March delivery you will turn to the "Sales Summary" card and there you see if the present stock will cover the demands up until April, and if so you will place an order to cover your maximum stock requirements, for your records show you should carry the maximum stock through April, May, June, July, August and September.

But if it were along in October and you were placing the order for immediate shipment you would only order enough to bring the stock up to the minimum amount. This same plan will be followed in purchasing other supplies.

Insures an Adequacy of Stock.

Through this system you have your largest supply on hand during the period there is the largest demand and your smallest supply during the quiet season. Unless conditions justify the good buyer will only purchase a month's supply at one time. If market conditions are such that he feels he can save the firm enough money by ordering ahead to cover the interest charges on the capital thus tied up and an additional profit, he shall not hesitate to do so, but under normal conditions he will buy only as needed, and when the market is exceptionally weak he shall purchase in even smaller quantities.

He must also keep in mind the shipping conditions and the supply. If goods are hard to get he will always keep on hand an extra supply to take care of the demands should he have trouble in securing stock; the same is true in cases where the shipping conditions are unreliable.

By carefully watching these records when placing an order the buyer can avoid any chance of overstocking and also increase the rate of turnover.

Value of Comparison of Records.

On the "Sales Summary" card, Form No. 2, will be kept a record of the sales of each article by months. A separate card will be kept for each article and at the close of each month the buyer will take his "Buying and Stock Record" card and figure the total number of each article sold that month and enter this figure on the "Sales Summary" card opposite the month in which they were sold. This card provides for keeping the sales record of each article for four years. These records become more valuable as time goes on, for it is the records over a period of years that enable the buyer to figure accurately the sales possibilities of the article.

This card shows the buyer the number of any particular article he sold during a given month and by having the record for a number of years he can see just how these sales vary and gauge the possible demand during the same month of the present year. For instance, should his sales record show him that during April, 1915, he sold 132 31 by 4 intertubes; during April, 1916, he sold 176 of the same size tubes; during April, 1917, he sold 154, and during April, 1918, he sold 203, he will be safe in estimating the sales possibilities for April, 1919, on this tube at right around 175. If the sales should not equal this total it shall not fall short of this figure enough to cause him to be overstocked and if it runs larger than this figure he can very easily secure a new supply.

The good buyer will guard carefully his rate of turnover on every article and shall be constantly trying to increase the rate. He will watch his records to see that the rate he wishes to secure on each article is being maintained. If sales on any article should drop off he will decrease the amount of stock he carries so as to maintain his rate of turnover. The only time he will take any chance at decreasing that rate of turnover is only in cases where he figures that by buying in a large quantity the extra profit thus obtained will be sufficient to overcome the loss through the decrease in turnover.

With such a system of records as described here the buyer eliminates all guess work in buying. He bases his purchases upon figures and facts that assure him of sufficient stock, yet never an overstock, to meet all demands. It also decreases the amount of capital invested, cutting down the interest charge and leaving plenty of capital with which he can stock new articles upon which the business can increase sales and make new friends, and, incidentally, increase the profits.

System is back of the good buyer's guess and as an element of success system in buying is second to quality only.

AUTO SHOPS ARE NEARING NORMAL PRODUCTION.

Slight improvement has been noted in the buying of finished steel products. The automobile shops are not yet up to normal rate of car production, but they will be soon, and in any event they have occasion to build up their stocks, it being the normal practise to have supplies of steel well ahead. There is a fair demand for sheets from the agricultural implement makers, but this demand never runs into very large tonnage.

VICTORY BALL TO HONOR WAR VETERANS.

The chauffeurs of the Automobile Club of America recently held a victory ball in New York in honor of the members of their organization in war service.

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ENGINE STARTING IN COLD WEATHER

How the Driver May Obviate Much Effort and Insure Good Initial Ignition by Care If the Car Is Kept in Unheated Garage.

ENGINE starting in winter months was never easy, even in the days of high grade gasoline, but with low grade fuel, which is practically the only quality now obtainable, starting has become a work of uncertain duration and results. The struggle with the engine usually begins at the garage door and continues for a half mile (if the machine can be driven that far), the motor missing, "popping back" into the carburetor and stalling, until it has been so heated that a combustible mixture can be drawn into the cylinders.

Comparatively few garages are heated day and night and the percentage of cars that are kept in temperature that will insure quick starting is really very small. Since the temperature of the water in the cooling system largely influences engine starting, unless a garage or place of storage is reasonably warm the fuel will not volatilize. The time of the lowest temperature of the cooling water will be the morning, even if a garage is kept well above the freezing point, and until the water has been warmed thoroughly the quality of the fuel admitted through a carefully adjusted carburetor will be anything but satisfactory.

Gasoline does not vaporize at low temperatures and its vapor is only combustible when it is mixed with air within a given range. For this reason one should insure that the conditions that will convert it into a serviceable fuel are realized so far as this is practical.

Good Conditioned Engine Essential.

A well designed engine in good mechanical condition, with clean spark plugs, valves tight, compression up to standard and the ignition system functioning perfectly can be started in the coldest weather provided a combustible mixture is admitted to the cylinders. But if it is for any reason below par mechanically one may be compelled to resort to varying means for starting it, such as placing heated sand bags on the carburetor and intake or pouring boiling water over the carburetor, which are generally the last resorts of experienced drivers.

Much of the difficulty met with in starting can be obviated if the cooling system is drained when the machine is left for the night. In the morning, when in readiness for use, the radiator should be filled with very hot water and after it has stood from 10 to 15 minutes and the metal has absorbed the heat the water should be drained from the radiator and engine jacket. The radiator and hood should be covered with blankets or robes, which will lessen the radiation of the heat. The radiator and engine jacket should then be filled. As the capacity of the cooling system of the average passenger car chassis is from four to six gallons, refilling it several times is not so laborious that it can be rejected by the driver who wants to be certain that the engine will start positively and run efficiently.

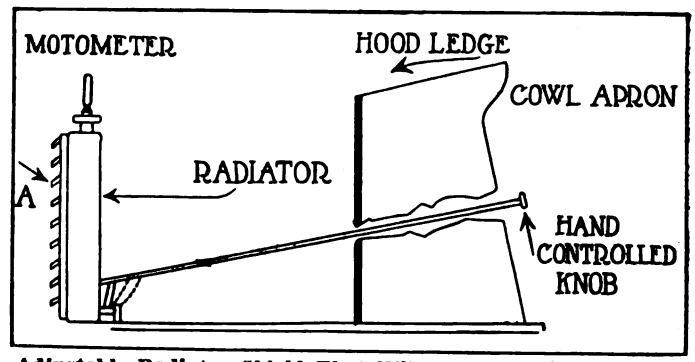
Another means of insuring starting is to have a can containing a mixture of ether and high grade gasoline, or a can of ether. The mixture or the ether are highly combustible and when injected into the cylinders through the priming cocks or other priming device, will usually ignite and afford sufficient initial power so that the engine will continue to fire. The mixture is probably the better, because it is less expensive than pure ether, and the result will be quite as satisfactory. There is no reason to apprehend deleterious effect of the use of ether upon the cylinders, pistons, valves, etc., although sulphuric acid is used in manufacture of ether, for in the process of production the ether is removed (taken away) from the acid and there is no probability of even minute volume remaining.

In starting the engine the choke lever on the instrument board should be set at "choke" or "gas," for a rich mixture. Where there is no choke lever a cloth may be saturated in the priming fuel and placed over the air intake of the carburetor. With the ignition switch at "on" the engine should continue to run if started with the motor or the hand crank. Should the engine not start with these conditions as stated, one should look for a mechanical defect in the ignition system of carburetor, or possibly of compression, instead of accepting that failure is due to low temperature. One should remember that a slightly richer mixture is required in winter than in summer months.

Should Examine Battery Frequently.

One should examine the battery frequently to learn its condition and whether it will produce a hot spark at the spark plugs. The electric output of a battery is always lower in low temperatures, but it will, if the battery is in good shape, be restored with the rise in temperature. For this reason one should conserve its current so far as possible and this can be done to a surprising degree. During cold weather the heavy oil in a transmission gearset case will be congealed to semi-fluidity—possibly even to the consistency of grease—and it will require power to turn the gears in it. If the clutch is disengaged while starting the engine this will lessen the load upon the battery to minimum and will materially lessen the current demand. After the engine has been started fuel can be saved and efficiency increased by running it idle, with the throttle about a third open, until it has been warmed.

When driving in extremely cold weather and when standing the radiator and hood should be covered. If there is a temperature indicating device fitted to the radiator this should be closely observed to see that the temperature does not exceed 190 degrees and does not fall below 120 degrees. Or, in other words, the radiator should be covered until the red fluid of the indicator begins to enter the white circle that bears the words "summer average." One should keep the radiator temperature as near this standard as is possible. The water in the radiator is intentionally in very thin cells with very large surfaces for the volumes they contain, and much heat is lost from the rapid diffusion of heat and freezing is not uncommon. Steam issuing from the lower radiator connection or from the filler cap may mean an obstructed passage and perhaps that the radiator is frozen at one point and is excessively hot at another.



Adjustable Radiator Shield That Will Vary the Circulation of Air to Meet the Need Indicated by the Reading of Motometer.

Exposed Radiating Surface.

Too much radiating surface exposed in cold weather may cause the engine to missfire, with consequent loss of power and reduction of combustion efficiency, for instead of the fuel being a vapor it may be a liquid that will burn very slowly, if at all. Of course no attempt should be made in cold weather to use a car without an anti-freezing solution in the cooling system, as a badly frozen radiator may be beyond repair. Such solutions can be obtained from any automobile supply house, mixed and ready for use.

The fuel condenses in a cold engine and it reaches the cylinders perhaps as a fluid that may flow down past the piston rings, into the crank case, diluting the lubricant intended for the engine and lessening its quality, so that if it is not renewed rapid mechanical wear may result. Since the advent of the high speed engine maintenance of adequate oil films between moving parts is none too easy under normal conditions and complete lubrication is a serious matter unless all precautions are taken to obtain it.

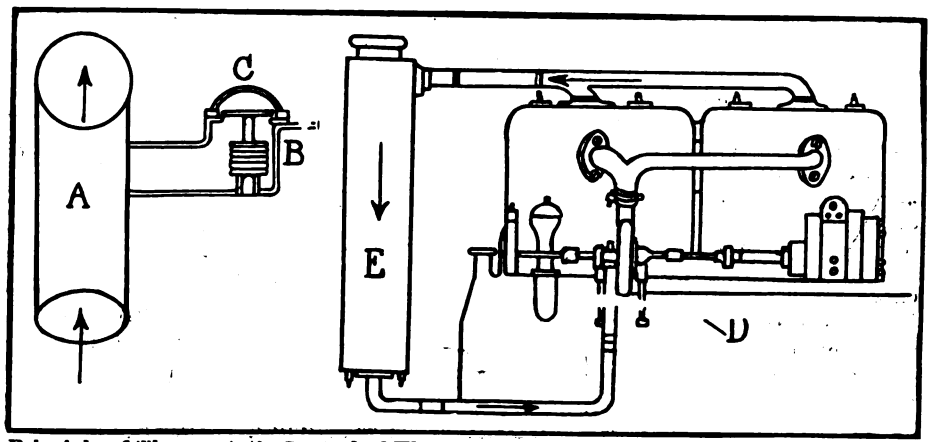
The cooling systems of some cars are equipped with devices for controlling the

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circulation of water or varying the areas of circulation. These devices are adjusted to keep the temperatures so far as possible between 120 and 190 degrees Fahrenheit. The range is considered to be the most practical from the viewpoint of mileage a gallon of fuel and power. One may safely state that good judgment dictates keeping an engine running in extremely cold weather, even when there is a non-freezing solution in the cooling system.

Should Heat Garage or Engine.

Owners who drive daily or use their cars through the winter should make provision to heat their garages or places of storage. Either gas or hot water heaters appear to be the most practical, and of these the hot water equipment appears to be the most satisfactory, from the fact that heat will be diffused so long as there is fire in the fire pot. Gas can be regulated to produce a fairly even temperature, but it must be kept burning or the building will chill. With steam, if the fire is banked, as for the night, the temperature will fall quickly and in the event of the use of water only in the cooling system the radiator or engine might be frozen.



Principle of Thermostatic Control of Water Circulation: A, Water Pump; B, Thermostat; C, Manifold from Radiator; D, Pump Connection; E, Radiator.

Electrical devices for garage heating are obtainable, which are claimed to afford satisfactory results, one general type warming the radiator and the engine water jacket with current taken from a lighting circuit, and the other type drawing current from the battery of the electric system of the vehicle. There are devices that heat the intake manifolds. One of these for which much merit is claimed is connected with a lighting circuit and is placed under the hood, which retains much of the heat. This can be utilized continuously for any given period without attention and will keep the temperature to a degree where the engine can be started easily whenever desired. The efficiency is increased if the radiator and hood of the engine are covered.

In selecting a garage heater, one that will afford long and efficient service is by far the best investment, for it will more than repay its initial cost in increased engine efficiency, freedom from repairs resulting from freezing, such as cracked cylinders, broken water jackets or ruptured radiators. Not only this, the laborious work with the starting crank is obviated and the discharge of the battery for starting is reduced to minimum. When the days are short and the greater part of the driving is done in darkness, when there can be little excess current generated over what is required for the lamps, there must be continuous drain upon the battery, and frequent outside charging will be necessary. Whatever will reduce this expense is worth considering, and in addition to this there are the other qualities that have been specified.

ROUTES TO SOUTH IN PASSABLE CONDITION.

Roads along the main trunk route from New York City to the principal resorts of the South, including Florida, are now in passable condition. The motorist going South with his car need have no hesitancy about making the entire trip by road. This is fortunate, because the extent to which automobiles are being shipped by boat has taxed the capacity of the steamship lines operating between New York and points along the South Atlantic coast, particularly Savannah and Jacksonville.

The A. A. A. Metropolitan Consulate Touring Bureau suggests to those who want to ship their cars, that they use the service between New York and Norfolk, Va., driving the rest of the way over fair roads. This alternative avoids a bad stretch of road just south of Washington.

GMC TO DEVELOP CHEVROLET AND UNITED MOTORS.

The General Motors Corporation has voted to offer 240,000 shares common capital stock for subscription to common stockholders of record at close of business Jan. 15, 1919, at $118 a share to the extent of 20 per cent. of holdings. It is understood the new money to be raised will be used largely in building up the Chevrolet and United Motors plants.

The first installment of 35 per cent. was payable Feb. 15, the second installment of 35 per cent. May 15, and the balance of 30 per cent. Aug. 15, 1919.

Alfred P. Sloan, Jr., president of the United Motors, said that the right which the United Motors has as a holder of 99,564 shares to subscribe to the new stock would be assigned to the stockholders of United Motors.

VICTOR RUBBER CO. MAKES BIG CONTRACT WITH FORD.

The Victor Rubber Co., Springfield, O., has closed a contract, running into hundreds of thousands of rubber mats, with the Ford Motor Co., Detroit. The mat department of the Victor company is now running night and day. General Manager F. R. Talbott states that prospects are bright for an unusually large business in 1919. Plans of the company for the year provide for expansion of its organization.

Mr. Talbot announces that the company's export business is growing rapidly, and that it is necessary to organize a department which will be devoted exclusively to the export business. Direct representation in South America and Europe is planned.

A two-story building, constructed of brick and concrete, was recently completed, and is now being used entirely for the production of pneumatic tires. It is announced that the new Victor cord tire will be ready for the market soon.

MUST APPEAR BEFORE FEDERAL TRADE COMMISSION.

The Buffalo Specialty Co., Buffalo, N. Y., maker of liquid veneer, tire fluids and similar products, has been cited to appear before the Federal Trade Commission March 1. Acting after informal complaints of competitors, the commission issued formal complaint against the company. The complaint states that the commission has reason to believe the concern, "with the intent, purpose and effect of stifling and suppressing competition," has adopted and maintained a system of fixing prices at which its products shall be resold by dealers, and refuses to sell to dealers who insist on reselling at their own prices.

At the same time the company was charged under the Clayton anti-trust act with discrimination in prices between different purchasers of its products.

STEBBINS WILL DIRECT AUTO BODY COMPANY.

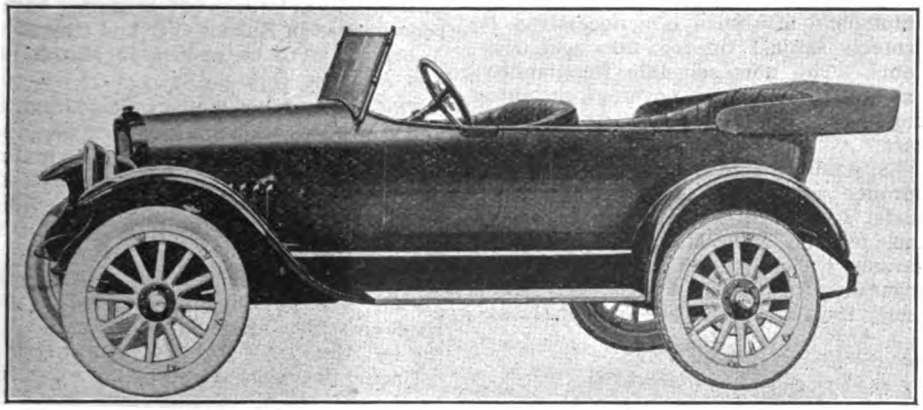
A. C. Stebbins, one of the best known business men of Lansing, Mich., who is an exceedingly capable industrial manager and banker, who retired two years ago from active business, has undertaken to direct the Auto Body Co. of that city as general manager and restore it to its pre-war activity, when it employed 1400 persons, had an annual pay roll of $1,500,000, and was one of the chief industries of the city. The former general manager, H. E. Bradner, retired because of ill health and Mr. Stebbins was asked to assume the management of the company.

GILLETTE RUBBER CO. EXPANDS ITS PLANT.

The Gillette Rubber Co., Eau Claire, Wis., is enlarging its works by the erection of a brick building, 40 by 125 feet, to accommodate inspection, shipping and warehouse departments. The company some time ago established a new department for the manufacture of solid tires.

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THE ALLEN MODEL 41 IN TWO STYLES



The Allen Model 41 Chassis Equipped with Five-Passenger Touring Body—A Pure Streamline Type.

THE Allen 41 touring car and the Allen 41 sedan for this year embody the best in late open and closed car design. The sedan is ideal for business as well as social uses, this body type affording maximum year-round service. Where the individual preference dictates the purchase of an open type car the Allen 41 touring model is equally well adapted for business or recreation.

The top of the sedan is permanent and of handsome design. All side windows can be lowered completely. The top pillars are permanent, insuring greater strength to the top. The doors are staggered, the one on left opening into the driver's compartment; the one on the right opens into the rear compartment. The driver's door locks with a thumb latch, while the door to the rear compartment is fitted with a Yale lock. The driver's door carries a ventilating fixture.

The sloping windshield is full ventilating and fitted with an adjustable rain visor, assuring a clear vision ahead in all weathers. The body and hood are finished in Liberty blue. The top, radiator and fenders are black, the wheels cream colored.

The Allen 41 touring car is of pure streamline design with high cowl, slanting windshield, full crowned fenders and deep upholstery. Choice of hazel brown or dark green body finish is offered. Brown cars are trimmed with brown upholstery, green cars with black upholstery. The fenders and radiator are black and the wheels cream colored.

The one-man top is built over substantial bows, the top material being of Rayntite. Side curtains and top boot fit smoothly.

These Allen cars represent the best in six years of untiring effort of the Allen Motor Co., Fostoria, O., to produce an ideal car. The vital parts are made in the company's own factories.

Gear shifting, hand brake and foot levers are placed conveniently. Women are attracted by the easy and convenient control. The all electric control device is mounted on the steering column just below the wheel. The switch for the starting current, all light controls and the horn button are combined in this one unit, for which a key lock is provided.

In the sedan body each joint is accurately tenoned and fastened together with screws. The woodwork is of thoroughly seasoned hard wood. Ample seat and leg room is provided for five grown persons. The seats are of a comfortable height and angle. The top lining, floor carpet and covering of foot rail are gray, harmonizing with the upholstery. There are gray silk roller curtains at the rear windows.

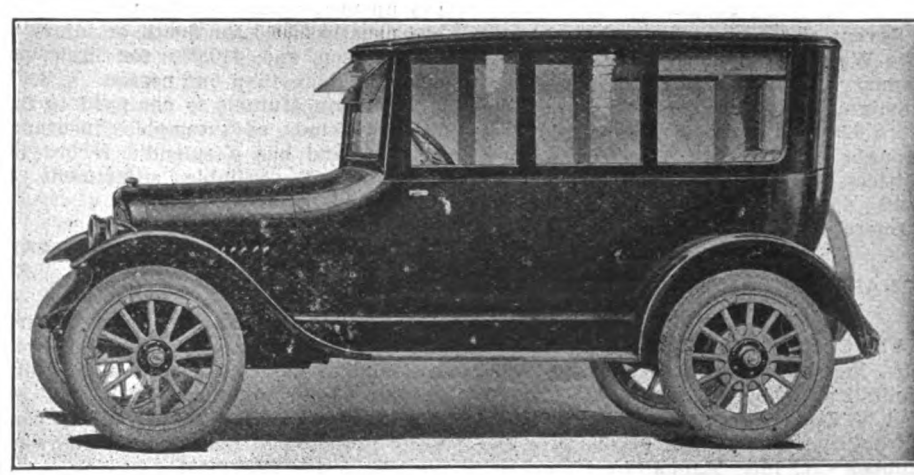
The touring car assures roomy ease and comfort for five grown persons. The side curtains are rolled to top bows when not in use. The rear quarter curtain can be left on permanently if desired.

The Allen series 41 models have a motor of the Allen, L head type, four cylinders, 3¾ by 5, with piston displacement of 221 cubic inches. The crankshaft is 2¼ inches diameter at connecting rod bearings. The valves are 1⅝ inches diameter, with cast iron heads, with nickel steel stems. The valve spring chambers are enclosed and the push rods are adjustable. The starting and lighting is by the Auto-Lite two-unit system, with electric control on steering column. The ignition is the Connecticut system with automatic circuit breaker, with Champion plugs.

The carburetor is a Stromberg, with hot air connection to the exhaust manifold, with air control on the instrument board. The cooling is by thermo-syphon circulation, with radiator of ample capacity, having Perfex honeycomb type core and trunnion suspension. The lubrication is a combination force pump feed and constant level splash system. The clutch is a 10-inch Borg & Beck single dry disc. The transmission gearset is the Allen selective sliding gear type, assembled with the engine in a unit power plant. There are S. K. F. bearings on both shafts. All gears have faces ⅝ inch wide. The gear ratios between motor speed and the rear wheels are 4 5/11 to 1 for high speed, 7.57 to 1 for second, 14.25 to 1 for low, and 16.8 to 1 for reverse. The steering gear is of the worm and full gear type, the worm operating against ball thrust bearings. There is a 17-inch steering wheel with corrugated rim. The touring model is furnished in either left or right hand drive for export.

The rear axle is of the full floating type, with heavy pressed steel housing. The ring gear and pinion are helical cut and are 1¼ inches wide across the faces. The full Hotchkiss drive is employed. There is a hollow propeller shaft with two universal joints. The service brake is 12¼ by 2 inches, external contracting, and the emergency brake is 12 by 1¾ inches, internal expanding. The springs are of vanadium steel and oil tempered, the rear, semi-elliptic underslung, 55 inches long; the front, semi-elliptic, 34 inches long.

The fuel tank, hung at the rear, has 13 gallons capacity and is fitted with a gasoline gauge. The Stewart vacuum fuel feed system is used. The wheels are wood, artillery type, with Firestone demountable rims, and one extra rim is supplied. The tires are 32 by 3½ inches on touring car, 33 by four inches on the sedan, with straight side, anti-skid treads at the rear of all models. The wheelbase is 112 inches, the tread 56 inches and the road clearance 11 inches. The fenders are full crowned and the running boards are aluminum covered. There is a mud splash guard below the radiator. The instrument board is of black walnut, mounting a Stewart speedometer, ammeter, carburetor air control, automatic ignition indicator and electric lamp. Standard



The Allen Model 41 Chassis Equipped with a Permanent Sedan Body Seating Five. The Doors Are Staggered.

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equipment is furnished with both cars. The net weights are: Open cars, 2465 pounds; sedan, 2725 pounds complete.

Every Allen car is warranted under the National Automobile Chamber of Commerce standard warranty. The prices f. o. b. factory are: Sedan, $1695; five-passenger touring car, $1195.

CITIES PLAN TO PARK AND GUARD AUTOMOBILES.

Some of the New England cities are awakening to the need of providing suitable places in the business sections for the parking of automobiles. Under present laws an autoist is liable to arrest if he leaves his car for more than a short time in places now used for parking. It is now intended to designate places where cars may be left for a reasonable period, and where they will be protected from thieves.

The crusade of the Boston police against parking automobiles in Pemberton square, which is near police headquarters, called attention to the growing need of providing suitable places for such a purpose in the city, more requisite in the business section than anywhere else. Many Boston autoists were accustomed to leave their cars in the square because they believed the nearness of police headquarters would serve to protect them from thieves. One day policemen took the names of all autoists who had left their cars there for longer than the period allowed by the police regulations.

An underground parking space for automobiles beneath Boston Common is proposed in the City Council. The plan calls for an underground parking space from Park Square to Beacon street in that section of the Common where the parade ground is located. The surface of the Common would not be disturbed. An entrance would be provided at Park square and an exit at Beacon and Charles streets. The entrance and exit would not infringe upon the Common.

Providence is considering the establishment of a special parking place in the business section, where police protection will be furnished for the cars.

NEW SETTLERS TAKE AUTOS TO CANADA.

Seventeen motor cars were shipped into Western Canada by new settlers in January, 1919, and 35 in January, 1918. Immigration returns show that there were 828 new settlers in January. They brought $622,220 cash. Most of the new settlers have bought farms through the land department of the cooperative farmers' organization.

CHARTERS FOR TIRE COMPANIES.

The Charlestown Tire and Rubber Co., Inc., has been incorporated with $6000 capitalization by J. Jacobs, S. Bernheim and W. Loewenthal, 1877 Broadway, New York City. The Cotton States Tire and Rubber Co., Inc., Manhattan, New York City, has been incorporated with $10,000 capitalization by the same parties.

"TWIN MUTUAL" AUTOMOBILE INSURANCE POLICIES.

Automobile owners now realize that automobile insurance is a necessity. It protects against thieves, fires and accidents. The new schedule for liability and property damage coverage on automobiles is based on the list price of the car.

Especially attractive rates for this insurance are offered by The Twin Mutuals, 40 Central street, Boston, which includes the Auto Mutual Liability Insurance Co. and the Massachusetts Auto Insurance Co. These companies operate under the strict insurance laws of Massachusetts, which are regarded as ideal.



A. Shirley Ladd, Secretary, Massachusetts Mutual Automobile Insurance Co.

The rates offered by The Twin Mutuals will doubtless strongly appeal to car owners who have been taking the risk of not carrying liability and property damage insurance.

When one stops to consider that 466 persons were killed, 7986 injured and 15,113 automobiles in accidents in 1918 in Massachusetts alone, he appreciates the need of insurance protection. Insurance companies will settle for a loss out of court if possible, in event of accident, and if suit is brought will defend the car owner.

In case of an award the company will pay up to the limits of the policy, which are usually $5000 for death or injury to one person and $10,000 for injury or death of more than one person.

The Twin Mutuals is equipped to furnish all kinds of automobile insurance at cost, and has a splendid record for prompt and equitable adjustment of losses and liability claims.

PLAN TO STANDARDIZE ROAD MARKING SYSTEMS.

Aiming to standardize highway marking throughout the continent, the Circle Automobile Men's Association of America has been organized with $100,000 capitalization in Dallas, Tex. The company proposes to place on all highways its distinctive mile post, carrying a system of code marks to guide the motorist and warn him of any pitfalls ahead. The company has a plant in operation, making posts, at Cement City.

The main office is in the Southwestern Life Building, Dallas, and branches have been opened in Kansas City and Chicago. A branch is to be opened in March in Los Angeles.

The system is protected by trade mark and copyright. A round sign surmounts a six-foot white post, with the trade mark in the center of the sign, the name of the next town or city above and the distance to same below the trade mark. On the post itself are the code marks indicating what the motorist may expect just ahead. An X, for instance, means a railroad crossing; an inverted L facing to the left signifies a bad turn to the right.

Under the plan there is no expense to the motorists. Garage men in various cities are asked to become members and their establishments are designated by the association with suitable signs. These establishments then lease posts from the association and install them on various roads leading into the city, each concern agreeing to put up at least 10 posts. Fourteen garages in Dallas are members, and five dealers in Fort Worth have joined.

The organization proposes to point out to tourists reliable dealers from whom they may obtain needed accessories and supplies, and to have such dealers provide the motorists with rest rooms and places for dispatching and receiving mail and telegrams en route. These official garages will also be clearing houses for road, weather and other information.

C. H. Wrightman is president of the association. Prominent Dallas men are among the officers.

HOOD RUBBER CO.'S BIG YEAR.

The Hood Rubber Co.'s war efforts last year were partially responsible for boosting the company into the $20,000,000 industrials. The actual net sales for the 12 months were $22,341,081, which compares with $18,573,765 in 1917, $11,666,501 in 1916 and $9,083,693 in 1915. In other words, as compared with the earlier years, the 1918 sales showed increases as follows: Over 1917, 20.2 per cent.; over 1916, 91.5 per cent.; over 1915, 145.9 per cent. Of the 1918 sales, about $5,000,000 were tires and $17,000,000 rubber footwear.

SOLDIER SON PREPARES TO GET DAD'S PLACE.

Capt. Glenn W. Tisdale, soldier son of Glenn O. Tisdale, president of the Franklin Motor Car Co., New York City, has joined the selling force of his father's organization with a view of learning the business thoroughly and eventually handling it himself. He returned from France in February.

GASOLINE AND OIL COMPANY.

The American Gasoline and Oil Co., Lancaster, Pa., has been chartered in Delaware with $50,000 capitalization by D. Brientnall, Lancaster, Pa.; J. B. Fleming, Indiana, Pa., and Levi McAllister, Quarryville, Pa.

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Wetmore-Savage Co., Makes Large Expansion

The Wetmore-Savage Co., has purchased the business, good will, stock and equipment of the Motor Car Equipment Co. of Boston and has opened a new automobile department at 180-182 Massachusetts avenue. The company will be able to serve the trade better at this location and will at all times carry a complete and up-to-date line of automobile and garage equipment.



V. C. Bruce Wetmore.

The company will retain, as far as possible, the present Motor Car Equipment Co.'s Boston organization and interweave with it several men from its own who are experienced in automotive equipment.

The Wetmore-Savage Co. has been the largest electrical supply house in New England and has operated an automobile department in connection with the electrical supply department for several years. The purchase of the Motor Car Equipment Co. will permit it to handle a larger business at once. The organization is unique inasmuch as it embraces both the allied electrical and automotive equipment lines.

All orders, correspondence, freight or express shipments pertaining to automobile supplies should be sent to the Wetmore-Savage Co.'s automobile department at 180-182 Massachusetts avenue, Boston.

The Wetmore-Savage Co., under the management of V. C. Bruce Wetmore and Hanson M. Savage, started in the electrical supplies business about 13 years ago in a modest way. Since then it has developed a business second to none in its line in New England.

Realizing the inevitable growth of the automotive equipment business several years ago, the company established a department for this trade, which had developed to such substantial proportions in 1918 that it was decided to extend that part of the business in a large way and seek a location for the department nearer the center of the automobile trade of the city.

The Motor Car Equipment Co. of Boston, the leading jobber in automotive equipment in New England, was offered for sale because of a reorganization of the parent company in New York. The Wetmore-Savage Co. saw the opportunity, grasped it, and almost over night became the owner of the stock and business in a deal which represented perhaps the quickest cash transaction ever put through in this trade in New England.

The general manager of the new organization is Hanson M. Savage. The sales are in charge of E. L. Allis, formerly manager for the Motor Car Equipment Co.; E. W. Littlefield and J. C. Lane of the Wetmore-Savage sales department. R. P. Greene is the purchasing agent.

Extensive improvements and additions are under way at the new store. The stock will comprise a complete and comprehensive line of accessories, with quick and facile service to the large group of customers who personally do their buying.

The business will be continued as before, 100 per cent. wholesale, and the policy of the firm will be the heartiest cooperation with dealers.



Hanson M. Savage.

The foundation upon which the success of the firm of the Wetmore-Savage Co. is based is a spirit of broad-minded democratic, personal service. Its slogan has always been "The House That Service Built," and the company has lived up to it.

It is the aim of the company to establish in New England in the auto accessories trade an institution embodying in its policy every factor which good business dictates and, more than that, in which the element of cooperation and service is developed to its highest point.

BOSTON OFFICE FOR JENKINS VULCAN SPRING CO.

The opening of a New England office at 819 Boylston street, Boston, with Frank B. Corlew as manager, increases the number of direct factory branches of the Jenkins Vulcan Spring Co. to seven. There are also more than 7000 dealer agencies throughout the country.

There was recently a change in the selling force executives at the factory, W. B. Edwards, formerly in charge of sales at Reading, Pa., becoming assistant general sales manager, with headquarters in Richmond, Ind.

The plant at Richmond has a floor space of 60,000 square feet, with a monthly production capacity of 400 tons. There is in course of construction a new concrete and steel plant that will be a marvel for efficiency and modern equipment. This building will have 125,000 square feet of floor space. When completed the monthly capacity will be 2000 tons.

The selling force is being increased in proportion to the production. The road organization now consists of 12 men, but will be increased to 25 by June 1.

T. B. Jenkins, president of the company, said: "We can justly claim the distinction of being the pioneers in the replacement field. Our niche is undeniably an important one in the motor world and is clearly emphasized by the ever increasing demand for reliable replacement springs. Ten years ago probably motorists would have scoffed at such an apparently absurd idea as devoting a business exclusively to springs for replacement purposes. But springs do break and at most unexpected places, and, with the millions of cars operating, the demand has compelled us to keep right on growing."

SELLS U. & J. CARBURETOR.

The U. & J. Carburetor Sales Co. has been formed in Detroit to handle the new U. & J. carburetor in Wayne county. C. F. Johnson is president.

MORTON WILL ENLARGE AUTO ACCESSORY BUSINESS.

The Rich building, located at the corner of Main and Irving streets, Malden, Mass, next to the City Hall, has been sold by Mrs. Joseph S. Rich to Arthur E. Morton of Malden. Mr. Morton will occupy one store in the block, with the intention of enlarging his automobile accessory business. He will retain his factory and salesroom in Mountain avenue. Mr. Morton will take the title on May 1. The building, which was erected in 1896, is assessed for $29,000, of which $18,000 is on the building.

WILL MAKE TIRES.

The Matthews Auto Tire and Supply Co., to manufacture tires of all kinds, has been chartered in Delaware with $100,000 capitalization by James B. Scott, New York; C. Hurley and M. M. Lacey, Wilmington, Del.

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OLDFIELD'S COMPANY PRODUCING 2500 TIRES DAILY



C. L. Reely, Advertising Manager, Oldfield Tire Co.



Barney Oldfield, Former Race Driver, of Los Angeles and Cleveland, President Oldfield Tire Co.



R. D. Gilbert, Secretary-Treasurer, Oldfield Tire Co.

Barney Oldfield is backing the Oldfield Tire Co. with a particularly strong organization. Mr. Oldfield, who is president, will divide his time between the company's headquarters, Cleveland, O., and the road. He expects to spend most of the summer in his touring car, supervising the field work of his company and visiting Oldfield dealers.

R. D. Gilbert, secretary and treasurer of the company, will have charge of the office headquarters. He is an executive of long experience with one of the largest tire manufacturers. Mr. Gilbert has specialized in sales promotion and policies, and is the chosen point of factory contact for the traveling force.

C. L. Reely, for the last three years advertising manager of the Glidden Co., resigned from the Glidden Co. to become advertising manager of the Oldfield organization. Both at the Glidden company and the Buffalo Shirt Co., where he was sales and advertising manager, Mr. Reely gave special attention to the formation of advertising plans, which meshed closely with dealer effort, and to furnishing dealers with various effective aids for local use. He has had an experience of more than 12 years in sales and advertising.

Though organized in January, the Oldfield Tire Co. is already in production on a schedule of 2500 tires a day. Oldfield tires are now being built at the company's specifications and inspection at one of the large Ohio plants. The Oldfield company, however, expects to have its own factory in Cleveland or nearby in the very near future.

When Barney Oldfield announced the formation of the Oldfield Tire Co. and his own retirement from racing, after nearly 20 years as a race driver, to assume the company's presidency, the surprise generally felt by the public was by no means shared by the close friends of the "Master Driver." Among them Mr. Oldfield's personal hobby was well known.

For years he had given as much attention to his tires as to the mechanical details of his racing cars. To this fact he himself always gave credit for his remarkable freedom from accident during the past five years of his career.

President Oldfield and his staff, following the announcement of the new company, have been very busy at the national shows, taking the preliminary steps toward securing distribution for the new tires. Many applications were booked from dealers and distributors, though the actual closing of the contracts was not begun until March, when an experienced corps of traveling representatives left the company's headquarters in Cleveland to close negotiations with the selected applicants.

Barney Oldfield, in describing the Oldfield tire, said: "The Oldfield tire is my idea of what a tire ought to be. It has built into it all that I've learned in more than half a million miles of racing and touring, and in three years of directing my own business, the Oldfield Tire Co. of California. It's a quality job all the way through, tough and strong and easy riding. It's two-cured, wrapped tread and the tread is zinc tempered. Every Oldfield tire is inspected not once or twice during its manufacture, but four times. And it goes to you with my own personal recommendation."

It is announced that the merchandising campaign back of the Oldfield tires will be big and broad and forceful. The company will cooperate with merchants to the fullest possible degree.

Because of the tremendous popularity of Barney Oldfield, and the fact that every motorist realizes that Oldfield should know everything worth knowing about a tire, there is every indication that the Oldfield tire will go "over the top" as triumphantly and victoriously as the Yankee soldiers did in France.

OPEN BOSTON SALES ROOMS FOR BIDDLE CARS.

The Guertin-de Rochemont Co., Boston, distributor of Biddle motor cars, is now established in new sales rooms at 749 Boylston street and has acquired the building at 71 Amherst street, Cambridge, for a service station. This was formerly occupied by Fred S. Smith as the Mercer service station and the Mercer force of mechanics is with the new organization. Both A. E. Guertin and P. H. de Rochemont were identified with the Mercer agency.

In addition, they have with them M. P. Hayden, formerly a Mercer salesman, and more recently a naval aviator. Roy Jackson is another Biddle salesman.

The company has on exhibition a standard Biddle four-passenger touring model and a snappy two-passenger Speedwar Special.

At the Boston Automobile Show the five-passenger sedan, which created a most favorable impression at the Chicago show, will be exhibited. This machine has the body interior finished in mahogany and broadcloth, with the door interiors in wicker and is a beautiful example of modern coach work. Town cars and broughams are also on the way.

The distributor will begin deliveries July 1 on a Biddle car equipped with a 93-horsepower Duesenburg motor of four-cylinder type, mounted on a special chassis. This chassis will also be shown at the Boston show.

RADOYE DIRECTS HAYNES ADVERTISING.

Gilbert U. Radoye has become advertising manager and assistant sales manager of the Haynes Automobile Co., Kokomo, Ind. He has been associated with the Packard, Hudson and Nordyke & Marmon companies, having been in the automobile industry several years.

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PROTESTS AGAINST BAY STATE INCREASE IN FEES.

William A. Thibodeau of the Automobile Legal Association, in protesting against the bill of Mayor Peters of Boston for the tripling of fees for auto registrations in Massachusetts, charges that there is a scheme to make the owners of cars help make up the deficit that will result from loss of revenue for liquor licenses.

Under the bill the owner of a car of less than 20 horsepower would have to pay $15 annually for registration, rather than the $5 he now pays; the owner of a car from 20 to 30 horsepower would pay $30 instead of $10; from 30 to 40 horsepower, $45 instead of $15; from 40 to 50 horsepower $60 instead of $20; above 50 horsepower, $75 instead of $25. Motorcycles would pay $6 instead of $2.

"This would mean an additional burden on the automobilists of Massachusetts of $2,000,000 annually for which they will receive nothing," Mr. Thibodeau said.

"There are in this state approximately 200,000 automobiles of all classes, supported by 100,000 automobile owners. The triple fees mean an additional burden on each autoist of about $20 annually on an average.

"A large part of the extra tax will fall on the poorer man. From one-quarter to one-fifth of all the pleasure cars in Massachusetts are owned by men earning not more than $1500 annually. One-third of the pleasure cars are owned by men earning not more than $2000 annually.

"The cost of running a pleasure automobile annually is about the original cost of the auto and, since the life of a car is about four years, the pleasure car owner already spends during the four years four times the original cost of the car. To place an additional burden of 200 per cent. on the auto owner for registration fees, without giving him anything in return is legislation of a class that has never before been passed in this country.

"This bill is without the support of the mayors of Massachusetts or of the town authorities and is proposed and sponsored only by the mayor and by the city of Boston, in anticipation of a very heavy deficit in its revenue because of the loss of liquor licenses next year. I think that is all there is behind the bill. It is wholly unfair and without a single redeeming feature."

INSTRUCTS CHAUFFEURS.

The Colt-Stratton Co. of New York City is conducting a spring automobile instruction course, one class being devoted exclusively to the coaching of chauffeurs and drivers in the economies of operation and maintenance expense.

LOZIER PLANS NEW CAR.

H. A. Lozier, head of the former Lozier Motor Car Co., and later of the Hal Motor Car Co., Cleveland, is said to be at work on a new automobile in or near New York.

RENTALS OF AUTOMOBILE PROPERTY IN BOSTON.

Lalime & Partridge, Inc., automobile agent, has rented for a long term the new three-story and basement building to be erected on the northerly side of Boylston street, next to the corner of Ipswich street, Boston. The ground already has been broken and the building should be ready for occupancy Sept. 1.

The store and basement at 221 Columbus avenue, in the Pope building, have been leased for a long term by the trustees of the estate of Albert A. Pope to the Galvin Used Car Co. The lessee will occupy the premises on completion of extensive alterations.

SOWERS TAKES LEXINGTON FOR NEW ENGLAND.

A. H. Sowers has taken the Lexington car agency for New England and has opened retail sales rooms at 753 Boylston street, Boston, with George Kimball in charge. Mr. Kimball is a Boston man and had the Corbin agency there for some years previous to going to Portsmouth, where he has handled two makes of cars the past five years.



A. H. Sowers, Prominent Boston Dealer, New England Distributor of Lexington Cars.

Mr. Sowers has a large service station at Brighton square, where there is every facility for meeting the requirements of Lexington owners.

FIRESTONE TIRE AGENCY IN PROVIDENCE.

The Firestone Tire and Rubber Co. has opened a new agency at 50 Weybosset street, Providence, R. I.

E. P. Jones is the new branch manager in New York and Brookiyn for the company.

LIBERTY CAR SIGHTSEEING CO.

The Liberty Car Sightseeing Co., Inc., has been incorporated with $25,000 capital by E. M. Bernstein, M. Monfried and J. G. Barron, 299 Broadway, New York City.

BOSTON WANTS POLICE TRAFFIC SQUAD.

The Boston police department may soon have a traffic squad. It has seemed strange to many persons that Boston has never developed such a squad, but has depended upon its regular force of policemen to handle a problem which has yearly increased in difficulty.

New York has long had the service of a large, well balanced and strongly effective traffic squad under one head. Rules and regulations are enforced systematically over wide territory. There are no conflicts of authority and no variance in operation.

The late Police Commissioner O'Meara of Boston believed that because of Boston's peculiar conditions a traffic squad could not be efficiently operated.

The agitation for a traffic squad has been revived recently and there is indication that one may be established.

NELSON CHIEF ENGINEER OF PREMIER MOTOR CORPORATION.

The Premier Motor Corporation, Indianapolis, Ind., announces the appointment of A. L. Nelson as chief engineer, to succeed C. S. Crawford, who has been advanced to the position of director of engineering and assistant general manager. Mr. Nelson was chief experimental engineer of the company, and, with the event of war, his services were tendered to the government.

Following an inspection trip to Europe he was appointed consulting engineer of the Aircraft Armament at McCook Field, Dayton, O. He specialized in aircraft armament and the apparatus which he successfully developed for firing machine gun bullets between the propeller blades, and which was standardized for all American planes, is now officially known as the Nelson gun control.

METZ MASTER SIX ON EXHIBITION IN SALES ROOMS.

The new Metz Master Six, the latest product of the Metz Co. of Waltham, will not be exhibited at the Boston Automobile Show, but will be shown for the first time at the new Metz sales rooms, 915 to 921 Boylston street, Boston. The car, which is built in Waltham, is the latest arrival in the automobile field and is sure to attract attention. It will be on exhibition in the sales rooms while the show is in progress.

SELLS ELGIN IN NEW YORK.

The Elgin Motor Distributing Co., Broadway and 57th street, New York, has been formed by Winston Sanger, Elias L. Sanger and Henry Wise, to sell Elgin automobiles in the metropolitan district.

TO MAKE AIRPLANES.

The General Aerial Transportation Co., to manufacture airplanes, etc., has been chartered with $1,000,000 capitalization in Delaware by J. A. Frere, New York; A. M. Haack, Jersey City, and J. M. Frere, Wilmington, Del.

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DE PALMA AT DAYTONA SMASHES WORLD'S RECORDS.

Hurdling over the ground at Daytona Beach, Ralph De Palma, in his aviation motored Twin-Six, shattered the record for a mile with a standing start, by a mark of 38.83. This record was formerly held by Oldfield, at 40.53. After three days of the most spectacular bursts of speed in the annals of motordom, De Palma quit the beach with all the records ever made there.

His first sensation was a mile straightaway with a flying start, in 24.02, or at the rate of 149.87 miles an hour. This lowered the mark set by Burman eight years ago in a Blitzen-Benz, on the same course, by 1.38 second. Four days later De Palma set new marks for the two, three and four miles, in 49.54, 1:1.04 and 1:39.77, respectively. Even the Darracq record of 2:34 for five miles, made by Hemery 13 years ago, was beaten, De Palma covering the course in 2:04.58, nearly half a minute faster than the French car's time.

De Palma covered the 10 miles in 4:9.30, smashing Bruce Brown's record of 5:14.40 in a Blitzen-Benz nine years ago. The 20-mile mark was twice shattered, the final record being 8:54.20, nearly five minutes faster than Burman's Buick Bug mark of 13:11.92, made at Jacksonville, Fla., eight years ago. In getting this De Palma had to swing out 792 yards behind the finish line of the 10-mile straightaway, doubling back on his course.

The crowning achievement of his last day on the course was his mark of 6:48.75 for the 15-mile straightaway, clipping over three minutes off the record held by Lancia in a Fiat at 10 minutes flat.

In addition to applying the aviation experience to the design of the fast Packard, and using streamline principles in axles, frame, etc., as well as body, Goodyear straight side cord tires were used.

It was apparent that the machine was not built for a flash mile, but had an engine and a chassis of enduring qualities and consistent design. There was but slight variation in the miles per hour in all events.

De Palma served Uncle Sam as a director of flying at McCook field, near Dayton, O. His service in the aviation was rather brief, as he enlisted a couple of months before the war ended. But it lasted long enough to give him a good experience in flying. De Palma said he preferred to do his speeding on the ground.

"On a trip of several hundred miles in the air you may be making speeds which would be terrific in an auto—140 miles an hour," he said. "But at the height of a mile or more you have no realization of speed, and sitting up there in the wind and noise is lonesome work. The stunts are more exciting, of course, but there is no competition, no audience, no applause.

"Traveling over the ground at Daytona Beach in a racing car at 2½ miles per minute with 50-foot leaps from the ground, or whirling around the Indianapolis motor speedway track in the 500-mile race, with competitors contesting every lap—that's very different stuff. Every minute has its problem and its thrill.

"I prefer to be down on the ground, smelling the gas, eating the dirt, in contact with my rivals and the crowd."

A week after his discharge from military service De Palma was back in New York, tuning up his two Packard racers, equipped with aviation engines. One of these is his "big car" of 905 cubic inches with which he broke all records at Daytona. The other is his "little car" of 299 cubic inches displacement with which he will go afer the lion's share of the $50,000 cash prize at Indianapolis, May 31.

These two cars have broken every official automobile record in the world except one, the German Blitzen-Benz achievement of 142 miles per hour.

De Palma trains for his work by temperate living and a little bicycle riding daily to keep on edge. He realizes that physical training can easily be overdone, as exhaustion might follow too severe exercise. Mental training is far more important in his opinion.

QUALITY FEATURES BE-BE-CO AUTO SPECIALTIES.

The Boston Blacking Co., Third street, Cambridge, Mass., maker of Be-Be-Co au-



tomobile specialties, is an old established concern, in business since 1889. It is the largest house of its kind in the world, with a business of millions a year.

The company's goods are noted for their high quality, never having been made simply to fit prices. No poor quality product was ever turned out by this concern.

Its new auto dressings embody all quality features. The company has agencies in the largest cities in the United States, Canada and abroad. Among its specialties are Be-Be-Co Mohair Top Dressing, Be-Be-Co Leather Top Dressing, Be-Be-Co Seat and Slip Cover Cleaner and Be-Be-Co Cushion Dressing. There is a Be-Be-Co specialty for almost every car need.

STROMBERG CARBURETOR FOR STUDEBAKER CARS.

The Stromberg Carburetor Corporation is said to have closed a contract with the Studebaker Corporation whereby the latter will adopt the Stromberg carburetor as part of its regular equipment on its entire passenger car output. Forty thousand cars are called for in the Studebaker program for this year.

JARRARD SAYS AUTO PRICES WILL REMAIN UNCHANGED.

Automobile prices are to remain practically unchanged, according to the opinion expressed by T. E. Jarrard, vice president of the Apperson Brothers Automobile Co., Kokomo, Ind., upon his return from a six weeks' trip to the Pacific coast.

"The prices at which automobiles are selling at present must be maintained," he said. "There can be no appreciable reduction on the part of reliable manufacturers because any substantial reduction would mean a loss. Many rumors are floating around concerning the reduction in motor car prices. Any reliable manufacturer will tell you that there is not any likelihood of a reduction from present prices for a long time to come.

"This is due not only to the extremely high cost of living, but also to the demand for materials, causing its cost to remain high, and the necessarily limited production of cars. Right here it might be well to say that the output of motor cars, restricted as it will be by the problems arising out of the work of reconstruction, will not come anywhere near meeting the demand. So if you are figuring on a new car this spring you had better get your order in early.

"One thing we will find during the months ahead of us is that the manufactured car is going to supplant the assembled car in popularity. The buyer in these new times, upon which we are just entering, is going to favor the motor car which is built throughout from motor to rear axle in the one plant. Thus are the problems of service from the owner's standpoint reduced to a minimum, as he only has the one company to deal with.

"Another thing, automobiles will be bought more than ever before by direct comparison and on tested merit. Each car, to put it in the words of an old saw, will stand on its own bottom. The value of a car will be determined by its own merits—merits that can actually be shown that it possesses."

CHARTERED IN BAY STATE.

The Burton-Rogers Co., Boston, Mass., and Buffalo, N. Y., automotive equipment, has been incorporated in Massachusetts with $50,000 capitalization by Carlisle W. Burton and Mason T. Rodgers, Belmont, Mass., and James A. Massie, Penacook, N. H.

TO DEAL IN AUTOS.

The Comdelcar Co. of Massachusetts, Cambridge, to deal in automobiles, has been chartered in Massachusetts with $25,000 capitalization by Nahum W. Thompson and Edward S. Thompson, Boston, and B. L. Eaton, Brookline.

LIBERTY ENGINE CO.

The Liberty Engine Co., Seymour, Conn., to deal in gasoline engines and machinery, has been chartered in Connecticut with $100,000 capital stock.

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Maine Will Mark and Name 10 State Auto Routes

Maine is to undertake the color banding of the principal through routes of highway travel, following the method in use in Massachusetts and New Hampshire. The work will be started this spring by the Maine Automobile Association. This year 10 routes have been selected. A feature will be the naming of main routes of traffic. While this has been done in other states, nowhere will it be so complete as in Maine, and in doing this every effort has been made to retain the traditions of the country the highway traverses, and some outstanding, distinctly Maine name has been chosen in every case.

For instance, the Atlantic Highway follows the Maine coast from Kittery to Calais. The Longfellow Trail, named for the poet, is the route from Portland to Fryeburg, and was selected because Portland was Longfellow's birthplace, the Sebago Lake region one of his favorite haunts, and some of his ancestors came from the vicinity of Fryeburg, which he also made famous by his poems. The Aroostook Trail is intended to run through the heart of Aroostook county, and so on through the list.

The latest ideas in color banding have been adopted and several entirely new ones have been incorporated into the project.

The work of laying out these routes, naming them and selecting the color schemes has been in progress for several months under the direction of D. W. Hoegg, Jr., chairman of the touring bureau of the Maine Automobile Association, who was appointed a committee of one to have charge of the task. The plan has the full indorsement of the Maine State Highway Commission and will be carried on under the personal supervision of that department. The work is to be started on April 1 and is to be completed June 1.

Routes and Their Markings.

The complete list of routes to be named and painted is as follows:

No. 1.
ATLANTIC HIGHWAY.

Marking—Blue band, flanked, top and bottom, with narrow white band.

Route—Portsmouth, N. H.; Kittery, Me.; York Harbor, Kennebunk, Biddeford, Saco, Portland, Brunswick, Bath, Wiscasset, Rockland, Camden, Belfast, Bangor, East Holden, Ellsworth, West Sullivan, Milbridge, Harrington, Machias, Whiting, Pembroke, South Robbinston, Calais.

No. 2.
CAPITAL WAY.

Marking—White band and blue band of equal width.

Route—Portland, Gray, Danville Junction, Auburn, Lewiston, Greene, Winthrop, Augusta.

No. 3.
INTERNATIONAL TRAIL.

Marking—Red band, flanked, top and bottom, with narrow white band.

Route—Brunswick, Gardner, Hallowell, Augusta, Vassalboro, Waterville, Fairfield, Skowhegan, Norridgewock, Madison, North Anson, Solon.

Eventually this marking will be extended to the international boundary line, north of Jackman.

No. 4.
PINE TREE WAY.

Marking—Yellow band, flanked, top and bottom, with narrow white band.

Route—Gray, Sabbathday Lake, Poland Spring, Norway, South Paris, Bryants Pond, Bethel, Gilead, New Hampshire State line, near Gorham, N. H.

No. 5.
LONGFELLOW HIGHWAY.

Marking—Red band and blue band of equal width.

Route—Portland, North Windham, Raymond, Naples, Bridgton, Fryeburg.

No. 6.
UMBAGOG TRAIL.

Marking—White band and yellow band of equal width.

Route—Bethel, Newry, Grafton Notch, Upton, New Hampshire State line on route to Dixville Notch and Colebrook.

No. 7.
MOUNT DESERT TRAIL.

Marking—Yellow band and white band of equal width.

Route—Ellsworth, Mt. Desert Island Bridge, Bar Harbor.

No. 8.
AROOSTOOK TRAIL.

Marking—White band and blue band of equal width.

Route—Fairfield, Pittsfield, Newport, Bangor, Orono, Oldtown.

Eventually this marking will be extended north through the entire length of Aroostook County to Fort Kent.

No. 9.
POLAND SPRING-WHITE MOUNTAIN TRAIL.

Marking—Green band, flanked, top and bottom, with narrow white band.

Route—Poland Spring, Poland, Webbs Mills, Cooks Mills, Naples.

Between Naples and Fryeburg follow Pine Tree Way, marked with red band and blue band of equal width.

No. 10.
MOOSEHEAD TRAIL.

Marking—Green band and white band of equal width.

Route—Newport, Dexter, Dover, Foxcroft, Guilford, Monson, Greenville, Greenville Junction.

Wherever a route turns right or left at a fork, or intersecting road, the pole at this point will be marked with an eight-inch square of white paint, immediately at the bottom of the color band, and on this will be either the letter R or L. This will indicate whether the route turns to the right or to the left, R indicating right and L left. This system will be found decidedly simple and effective.

J. B. George, formerly of Boston, has become assistant sales manager of the Barley Motor Car Co., Kalamazoo, Mich.

Glenn T. Purdy, after foreign service with the colors, is back with the King Motor Car Co., and has been promoted to assistant purchasing agent.

America's Tracks to Stage World's Fast Races

Starting with Indianapolis on May 31 and finishing at Sheepshead Speedway on Labor Day, this season promises to be more active from a racing standpoint than any since 1914. Representative drivers from foreign countries will strive to win triumphs in the American races. There is little doubt that this country will have the world's biggest racing meets this year. Many of our men relieved from military duty will be back in the racing game.

European manufacturers will probably make no effort to have representation in the speed events in their own countries, but they will send their men to compete in the big races here. Germany will be the only country not represented.

Jules Goux, the latest entry for the $50,000 Liberty Sweepstakes of 500 miles on the Indianapolis Speedway, May 31, will drive a Peugeot. The car he will use is the same that Georges Boillot drove in the last French Grand Prix in 1914 and with which he gave the German Lautenschlager the battle of his life on the tortuous course near Amiens, France. In France, Boillot, who fell in the second year of the war, was an idol as an aviator as well as having been unusually successful with the Peugeot.

Goux was a bosom pal of the late Johnny Aitken, and when the two Peugeot cars were purchased by Messrs. Fisher, Allison and Newby, owners of the Speedway, in 1915, Goux wrote from the trenches to Aitken and advised the Indianapolis star to pick Boillot's car for himself. As a result Aitken gave Dario Resta, the 1916 champion, a battle for the crown and actually won when the number of races in which he finished first are considered, but lost out on a technical interpretation of the A. A. A. rules governing the title race.

Jules, who was the first foreign driver to win the Hoosier classic, copped the 500-mile race in 1913 and took the Wheeler-Schebler and Prest-O-Lite trophies to France. One of the incidents of Goux's career was that while he won the 1913 race he broke one of the first rules of the A. A. A. to do it. Goux, who has withstood many a gruelling road race in France began to tire after 400 miles over the brick track and when he pulled up to the pits for a tire change he called for champagne. He drank the wine that all Frenchmen love and with its bracing effect went out and finished the race. The A. A. A. rules prohibit intoxicants in the pits, but the officials winked at the infraction, for in France the sons of that country do not believe that aqua pura is a regular thirst slacker and use wine, where the American quenches his thirst with water.

The Oakland Motor Car Co., Pontiac, Mich., has reduced the price of the Oakland car $110, the touring car and roadster now being listed at $1075 and the sedan and coupe at $1650 f. o. b. Pontiac.

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When You Buy Oil

always remember the best quality and the right grade will cost less than a cheap oil.

Perfectly refined automobile lubricants are so made that a drop is equal to many drops of oil produced "just to sell" and that is sold because it is cheap in price. Eagleine Oil is scientifically made and there is just the grade for every make of car. Why should any owner gamble when selecting his oil. There is nothing saved in the first cost and poor oil must cause undue wear, and a quick depreciation of the whole car.

Experience has proven that poor oil sold at any price is a dear oil to sell and to use. Jobbers and dealers cannot afford to risk their reputation, patronage and profits by selling unknown quality oil. Eagleine Oils will afford more mileage for a given amount than any other lubricant made. It costs no more, so it is the cheapest to buy. It has afforded satisfactory service for years. Car owners everywhere will tell you that. Jobbers and dealers will recommend it for any car in any service. It saves money in miles driven and repair costs. It will not soot and there is little if any carbon trouble when Eagleine Oil is used. From 10,000 to 20,000 miles without engine trouble of any kind is common among Eagleine Oil users. This proves Eagleine quality and economy and once tried no other lubricant will do.

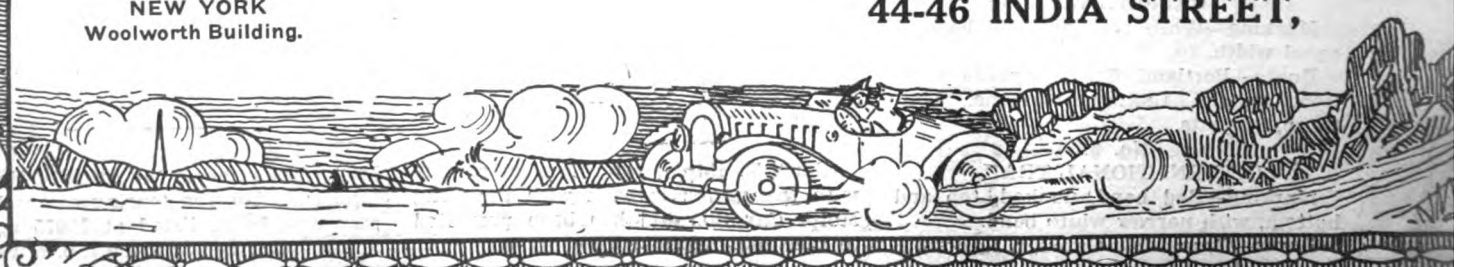
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Constant trouble through undue wear soon gets to be a mighty costly item in car operation. When it is noticed it is then usually too late to overcome cause of it. You all know what transmission and differential troubles are and what causes them: The remedy a good lubricant.

Eagleine Gear Oil will lubricate to the last drop. It is a heavy oil, scientifically compounded for use in the transmission and differential gearsets. It is made for just that purpose. Grease will solidify. Eagleine Gear Oil does not. It adheres to the gears and covers them with a cushion that protects them from wear and prevents friction.

With Eagleine Gear Oil the car operates easier. It is extremely economical because it affords much greater service than any other lubricant. Aside from that it eliminates the cause of the trouble and worry that must result when unknown quality lubricants are used.

Eagleine Gear Oil serves and saves. It is car insurance of the highest order. It will add years of service life to any car or truck. It is produced to Eagleine standard of quality and it is guaranteed to be the most efficient lubricant for transmission and differential gearsets that can be made.

When your dealer cannot supply you quickly, write direct stating type and model of your car.

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FEATURES OF SOME OF THE 1919 CARS

Characteristics and Qualities of Chassis and Bodies, Some of Them the Developments Made During the War

New Essex.

The Essex car, which is exhibited at shows for the first time this year, and which is built at the Hudson factory at Detroit, was designed to meet the demand for a moderately priced lightweight automobile having the qualities of more expensive cars. The Essex is made in one style only, a five-passenger touring car, having a 108½-inch wheelbase. The engine cylinders have a bore of 3⅜ inches and a stroke of five inches, and is claimed to develop something like 50 horsepower. The N. A. C. C. rating of horsepower is 18.2.

It is cooled by thermo-syphon, with the outlet manifold placed on the right side of the head to allow the intake valves being placed directly in the overhead center of the cylinder. The rocker arms of the inlet valves operate on roller bearings. The exhaust valves are on the side of the cylinder block. Balanced crankshaft and removable head are other features of the engine design.

The lubrication is by a circulating splash system: The pump stroke is adjustable and it is operated in conjunction with the throttle. Thus when the throttle is opened more oil is fed and vice versa. The engine is only 29 inches long. In unit with it is an eight-plate disc clutch running in oil. The Delco ignition, starting and lighting system is used. Timken axles are employed.

The radiator is fitted with shutters, similar to the Hudson, and controlled from the dash. Straight lines are very much in evidence on the Essex body and the bevel edge runs all the way to the radiator.

The upholstery is leather, applied in French plaited style. The curtains open and close with the doors. The standard body is green. The tires are 32 by 4.

American Beauty.

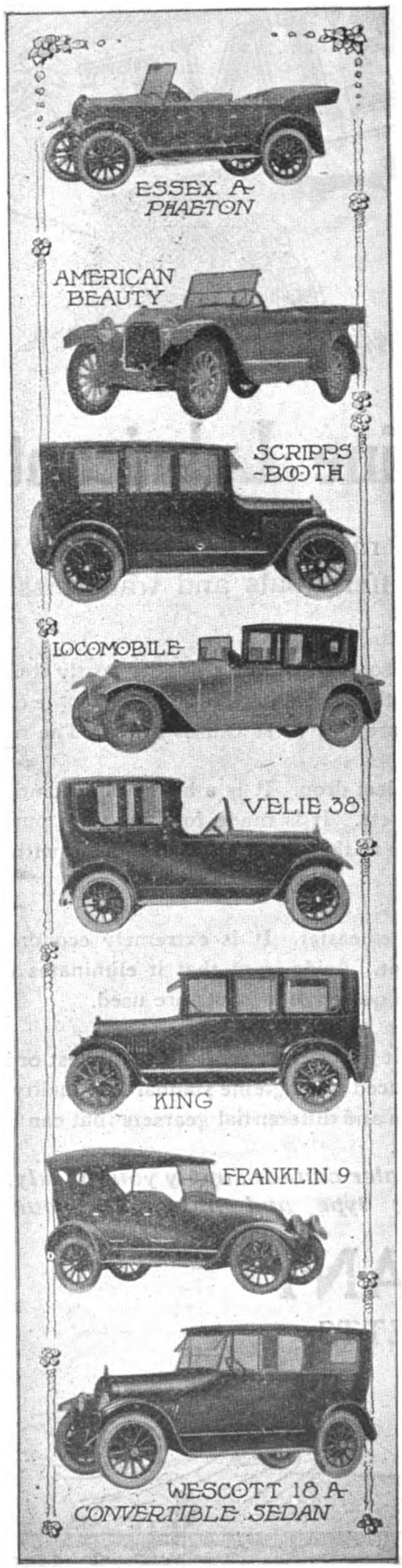
This year's models of the American Beauty includes a five-passenger touring car and a two-passenger roadster. There is a Rutenber engine. This car was formerly called the Pan-American. The body is low and graceful and there is a double cowl. The windshield has a pronounced tilt.

Only the five-passenger touring model was listed last year. The design gives the American Beauty the impression of a speedy car, combined with comfort.

Scripps-Booth.

Two new body designs have been added to Scripps-Booth models for 1919. These are a five-passenger sedan and a four-passenger coupe. The three-passenger roadster and the five-passenger touring car have been continued from last year.

All models are mounted on the same chassis, in which there are no important changes from that of last year. The wheelbase is 112 inches. The engine has six cylinders and a valve-in-head type, the bore and stroke being 2 3/16 by 4¾ inches.



The new models are leather upholstered, and are fitted with lined pantasote tops and curtains which open with the doors.

Locomobile.

In the Locomobile series models 38 and 48 are continued with six body types. There are different wheelbases for the chassis, series 38 being 139 and series 48 142 inches. The engines are six-cylinder.

In series 48 the bore and stroke are 4½ by 5½ inches, and in the other series 4¼ by 5 inches. The 1918 design of clutch is used. The Berling tandem ignition system and the Lancaster crankshaft vibration damper are retained.

Velie.

Seven body styles are now available in the Velie Biltwell Sixes. Six of these are on the same type chassis, the seventh, a sport model, being on a larger, more powerful and more speedy chassis.

The chassis of model 38 has a Continental Red Seal engine, Borg & Beck clutch, Timken axles and other standard units. In this one type chassis a touring car, a roadster, a coupe, a sedan, a town car and a cabriolet are offered.

In model 39 the exhaust pipes extend through the hood and to the rear in a long, graceful sweep. Short running boards are used.

King.

The King eight-cylinder models have been slightly modified in their lines and the finish of the top. A new type of ignition has been installed this season and the former propeller shaft brake has been removed, both brakes being on the rear wheels.

The wheelbase length of 120 inches is retained. The rear suspension is the cantilever spring used in the King cars for several years. Improved riding qualities are made possible by the employment of flatter springs. There has been a slight redesigning in the fenders. The Stewart vacuum feed is still used.

Franklin.

Six body types are offered in the Franklin, a seven-passenger limousine, a two-passenger roadster, a five-passenger sedan, a four-passenger roadster, a four-passenger brougham and a five-passenger touring car. The engine is air cooled. The chassis is continued practically without change from last year. The wheelbase is 115 inches. The engine has six cylinders with bore and stroke of 3¼ by four inches.

Westcott.

Among the changes made in the new model of the Westcott, S-18-A, is a reduction in the size of the tires to 32 by 4½, from 35 by 4½. Five and seven-passenger touring cars, a four-passenger roadster, five and seven-passenger sedans and a four-passenger coupe are offered in the one chassis type.

The touring cars are of liberty green, the roadster blue or green, leather upholstered; the sedans and coupe gray or blue, with cloth finished interiors.

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Overland.

The New Light Overland would have been put on the market last spring, but the huge part taken by the Willys-Overland Co. in the manufacture of war supplies made necessary the abandonment of the introduction of this car until this year. The Overland model 90 is again popular this year. The Overland designers have also produced a new type, a sedan, which is a particularly pleasing example of small car coach work.

Although having to withhold production of the New Light Overland Four during the war because of the enormous amount of war work undertaken by Willys-Overland, the company has used the interval in giving the new car most thorough and exhaustive tests. Its performance under rigid road conditions is said to have revealed a remarkable concentration of the qualities a motorist desires to find combined in a car.

Apperson.

Following up the success of the Apperson Anniversary model, which is continued this year, the Apperson Brothers have launched what is known as the Standard model, which is sold at a much lower price. In the Anniversary model is to be found every extra feature, such as metal instrument board, added nickel plating, special fancy grades of leather for upholstering, etc.

The Standard model is equipped with the "Apperson 8" engine, the "8 with 80 less parts" (through the elimination of a complete camshaft and trigger board with the multitude of parts).

The Apperson Standard has a 130-inch wheelbase, and is from end to end an Apperson in all the striking constructional advantages that have made the name famous.

Two bodies are offered, a seven-passenger touring and a four-passenger fore-door sportster. The car has speed of from 60 to 65 miles an hour, and the engine is rated at 60 horsepower. The standard color offered is thistle green.

Packard.

The Packard chassis models 3-25 and 3-35 are continued this year. There have been a few minor changes. The body designs have been changed slightly, giving a lower appearance. The hood and body blend together without a break or bulge, straightline effects continuing from the radiator to the rear of the body. Visible door hinges are still employed and serve to relieve the monotony of the straight lines.

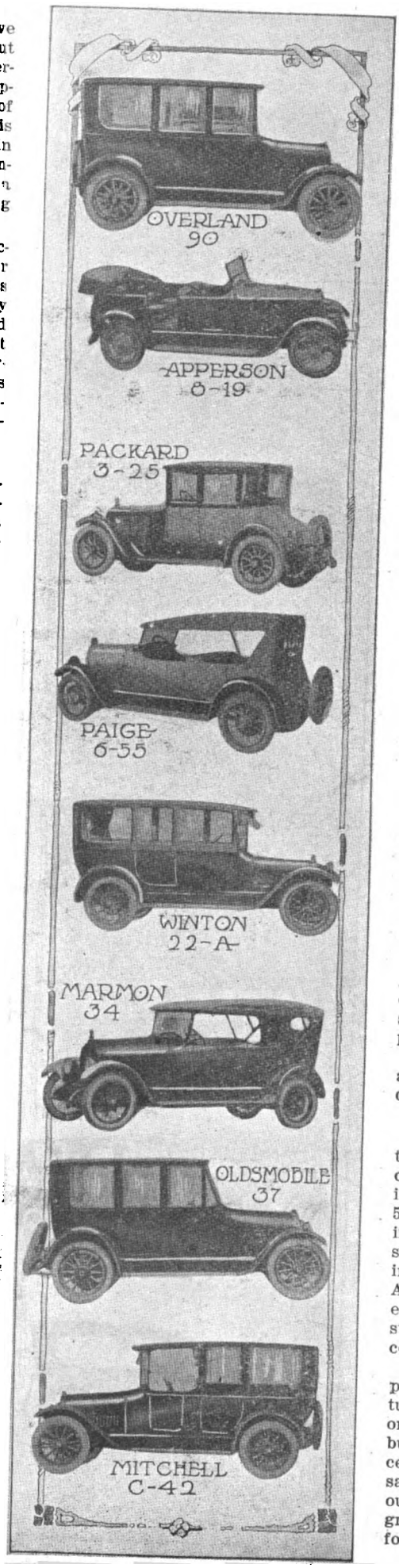
Seven styles of bodies are offered in the 3-25 model, and in the 3-35 there are six, all of which are seven-passenger.

Paige.

There have been many refinements in the Paige models, with improvements in lubrication, power and quality of material. The rear windows in the tops are of plate glass with metal frames, the isinglass windows having been discontinued.

In the Larchmont sport type there is an oblong glass with the corners slightly rounded and this goes nicely with the general straightline effect of the body.

The Linwood, a five-passenger model, has oval glass somewhat smaller than in the Larchmont and Essex models. Gypsy sides have been added to the top back curtain. The pistons are of better design than in previous models, better made piston rings insure good compression and there is freedom from oil passing up into the combustion chamber, as well as stopping the gasoline passing the rings and entering the oil in the crank case, due to low grades of gasoline.



Winton.

The Winton models are without important changes this year. The company was busily engaged in war work, and, also it is not the policy of the company to bring out new models each season. Changes found advisable are adopted as they present themselves.

Since 1907 the Winton Co. has manufactured six-cylinders exclusively. This long experience has not only produced annual improvements, but it has also developed an engine excellence that, more than ever, makes the Winton Six an ideal car.

Marmon.

In the Marmon design the aluminum engine, special frame and running board construction, graduated rear cross springs and other features are retained with body lines that are similar to those of last year. There have been various refinements.

The characteristic features of the Marmon cars include the general use of aluminum, the Z section frame, the three-piece touring body, the compound cantilever cross-suspension type of rear springs and the transmission held in suspension on the front end of the torque tube.

Oldsmobile.

The six-cylinder and eight-cylinder models are continued. The wheelbase of the six is 112 inches, the ratio of power to the car weight being exceptionally high.

The crank checks on the crankshaft are so curved that their center of mass is also their center of gravity. This gives a natural running balance. On the eight-cylinder model Lynite pistons are so fitted with rings that the act of oil pumping has been reduced to a minimum.

All of the models have a most desirable appearance, with splendid riding qualities.

Mitchell.

Mitchell has continued the D-40 and the C-42 models. The engine is the company's own make. It has six cylinders with bore and stroke of 3.25 by 5 inches for the D-40 and 3.50 by 5 inches for the C-42. The axle in the smaller six is three-quarter floating and in the other car is of the floating type. A variety of body types is offered in each of the models, and the same streamline body effects of last year are continued.

The new Mitchell is rather more a product of advancement in manufacture than in design. This is true not only in the sense that the car is better built and of better materials than preceding models appearing very much the same. It has been reshaped at numerous points and thereby made more graceful in appearance and more comfortable for riding purposes.

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Holmes.

Three body styles are offered in the Holmes air cooled cars. These are a seven-passenger touring, a four-door sedan and a two-door sedan, and these body designs are very distinctive.

The engine is six cylinders, with bore and stroke of 3½ by 4¼ inches. The valves are in the removable dome shaped cylinder head and are inclined.

The hood is somewhat near the conventional form with a rather high but slanting front and air openings in front with the hinges at the dash.

A Newcomb carburetor, vacuum feed, Eisemann magneto with automatic advance and Dyneto single unit electric system are used.

The valves are operated by an original type of rocker mechanism, the design being such as to compensate for lengthening the push rods so the timing will not be changed by expansion.

Chalmers.

Nine body styles are offered in the Chalmers. The closed cars include a five-passenger sedan, a three-passenger coupe, a seven-passenger town car, a limousine, a limousine-landaulet and a seven-passenger town landaulet. The open models include a seven-passenger touring, a five-passenger touring and a standard roadster.

The intake manifold of the ram's horn type is continued. This is made of simple piping carried on the exterior of the engine and so formed that it carries the gas to a hot spot in the side of the exhaust manifold and thence through the gradual curves to the intake valves.

Elimination of sharp curves prevents deposition of raw gas and reduces friction. The hot spot, however, imparts heat to the mixture. This is on top of the carburetor riser, so the gas is forced to come in contact with it and it is far more homogenous mixture because of the heat.

Economy is the special claim of the maker of the new Chalmers. The sedan is an unusually interesting model, but the lines and interior are not greatly changed.

Roamer.

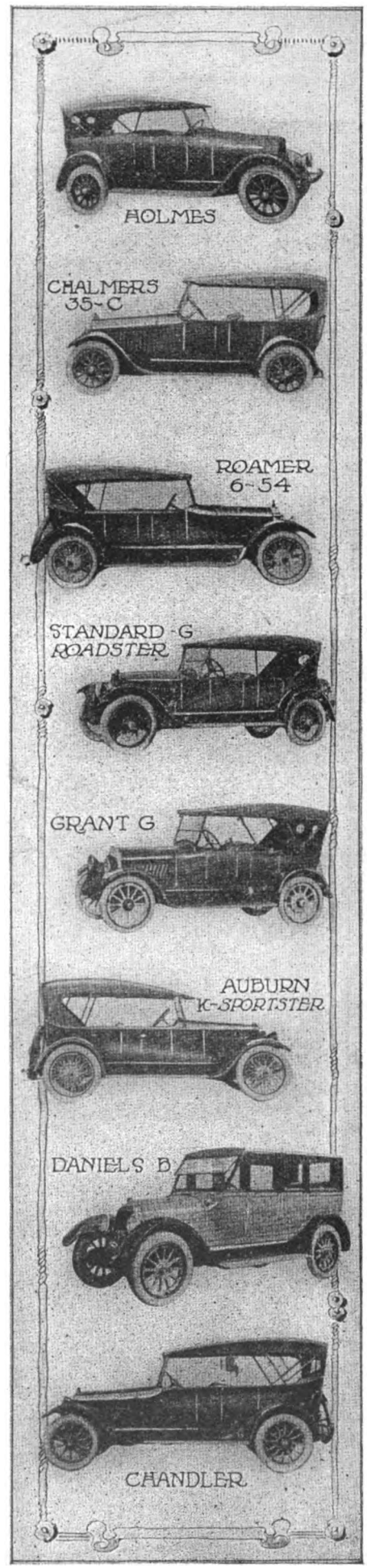
Special coach built bodies are available in the Roamer this year. Seven body styles are offered, these being fitted to a chassis with a wheelbase of 128 inches. The engine is a Roamer-Continental.

Thermostatic control has been adopted, whereby the water is held from circulating through the radiator until it has reached a good heat, the opening and closing of the thermostat valves being governed entirely by the heat of the engine.

The exhaust is carried to the rear of the car through seamless tubing. The brakes are operated from a double rocker shaft. The torque of the axle is taken through a heavy stamped steel torque member suspended by a buffer spring at the center cross member.

Standard.

Six bodies are offered in the Standard for this year. No important changes have been made. The chassis has an eight-cylinder engine with bore and stroke of 3¼ by five inches. The engine



is a Herschell-Spillman, developing 33.80 horsepower S. A. E. rating.

A Borg & Beck clutch, a Zenith carburetor, a Timken rear axle, Westinghouse starting and lighting, a Grant-Lees gearset, Spicer universals and Splitdorf ignition are employed.

Grant.

Model G will be continued until the fall, when the 1920 model will be ready. Numerous changes have been made in model G. The improvements include underslung rear springs, lower gearshift lever, aluminum molding between hood and cowl, a new top, gypsy curtains with plate glass windows in the back.

The finish is neater and great attention has been paid to all details. A touring car and a roadster are available.

The car may be had painted in maroon, striped with gold and cream wheels.

Auburn.

Two body types are offered in the Auburn Beauty-Six, model 6-39-H five-passenger touring and model 6-39-K four-passenger smart tourster. The designs have been changed considerably to the square lines. The finish is royal blue or purple lake for the bodies and hood with fenders and trimmings black enamel and Auburn gray.

The fenders are crowned and of extra heavy gage rolled patented flattened steel. A new, two-piece, clear vision, ventilating windshield has been added. The equipment includes a new electric headlight with auxiliary lights for city driving, electric cowl and tail lights.

The straight line of the bonnet merges with and is continued by the bevel edge of the body rail. The design is bold, radical and sweeping, yet not freakish.

Daniels.

Five body types are offered on the same chassis in the Daniels. The demand for special coach work is met by some splendid custom built bodies.

Standard units, such as Zenith carburetor, Brown-Lipe clutch, Timken rear axle and Westinghouse electric system are used.

The engine is an eight-cylinder Herschell-Spillman. The wheelbase is 127 inches. A four-passenger car painted in blue with unusually attractive upholstering is one of the offerings. The car is essentially a sport model and carries a golf bag on the left side just back of the front fender, with leather to match the upholstering and a Victoria top matching the paint work.

Chandler.

The Chandler has six models for this year, all mounted on one chassis. They include a seven-passenger touring, a four-passenger roadster, a four-passenger dispatch car, a four-passenger convertible coupe, a seven-passenger convertible sedan and a limousine.

The engine is Chandler's own make, with six cylinders, block cast, with bore and stroke of 3½ by five inches. The wheelbase is 123 inches.

The dispatch car is finished in an electric blue color for the body, the hood, fenders and running gear being black. The other cars are of standard blue body color with black running gear, fenders and hood.

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Cadillac.

Interior refinements on the closed models feature the Cadillac for this year. Eleven body styles are offered. A suburban body type has been added. All are on the same chassis.

An eight-cylinder engine with bore and stroke of 3⅛ by 5½ inches is used. This has detachable cylinder heads and an oil filling well on the fanshaft housing, a new feature for last year.

There is a tilting headlight reflector and an automatic top raising device. A feature is the absence of lace or braid, the binding material being the same as the plain material.

Ford.

The closed Ford cars for this year are being equipped with Liberty starters. Four body types are offered, a five-passenger touring, a two-passenger runabout, a two-passenger coupe and a five-passenger sedan.

Peerless.

The chassis model of last year is continued. The engine is eight cylinders, cast in fours and suspended from three points. The Auto-Lite starting, lighting and ignition system is employed. The generator is in the center of the V and at the front.

All bodies are fitted to the one chassis. The bodies include a seven-passenger touring, a four-passenger roadster, a seven-passenger sedan, a four-passenger coupe and a seven-passenger sedan-limousine. The wheelbase is 125 inches.

Nash.

The Nash passenger cars for this year embody no important mechanical changes. During the war Nash engineers further refined and perfected Nash cars both mechanically and in body design, but it was not deemed necessary or advisable to make any radical alterations.

In addition to the popular five-passenger touring model, the Nash series includes a seven-passenger touring, a four-passenger roadster, a four-passenger coupe and a six-passenger sedan.

The design of the new four-passenger model is attractive. It is a four-door type, having a smart, racy appearance. The wheelbase is 121 inches. There is an enamel beveled edge. The fenders and running gear are glossy black and the trimmings, including four outside door handles, are nickel. Two windows in the rear are fitted with beveled glass.

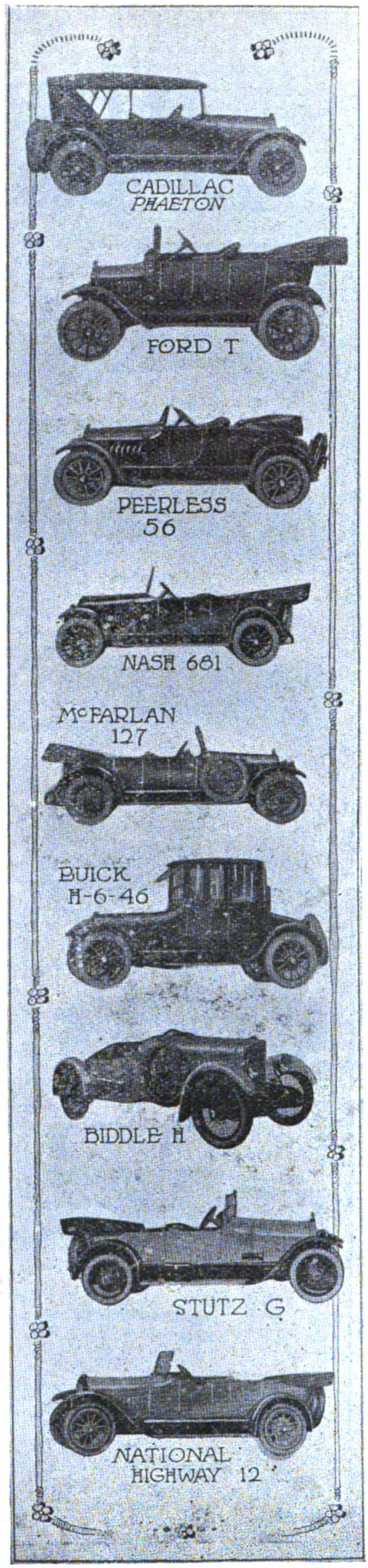
McFarlan.

There are no important changes in the McFarlan chassis. The company specializes in extraordinary body construction, covering everything from the touring roadster to the Victoria touring in open cars and from the large limousine to the special sedan in closed cars.

The valves of the engine have been slightly toward the head, resulting in short valve pockets and insuring better combustion.

Buick.

In the Buick 1919 models the valve lifters, rollers and pins have been made larger to reduce wear, a new oil gauge has been provided and the form of the oil filler is such it is possible to replenish the engine lubricant without a funnel. There are other slight improvements in the engine. Lubrication is made simpler throughout.



The louvres have been made narrow, this making an improvement in the appearance. A U. S. L. battery, a third larger than the former type, is employed.

A new top has been fitted and desirable changes made in the body. Six models are offered, a three-passenger open model H-6-44, a five-passenger open model H-6-45, a four-passenger closed model H-6-46, a five-passenger closed model H-6-47, a seven-passenger open model H-6-49, and a seven-passenger closed model H-6-50. Each is powered with the six-cylinder Buick valve-in-head motor.

Model H-6-49, a seven-passenger open car, has an extra length chassis, the same as that on which the seven-passenger closed model is built. There are two extra folding seats. The upholstery throughout is done in hand-buffed black leather, padded with curled hair and supported by patented cushion springs made of tempered steel.

Biddle.

Model H of the Biddle, with chassis improvements and new bodies, is continued. The special Buda four-cylinder engine has aluminum pistons and lighter reciprocating parts, increasing the speed and horsepower. The front and rear axles have been redesigned.

The new body types are the Speedway Special, a two-passenger roadster of racy style with removable top and windshield, and a four-passenger Salon sedan, which is built especially for the custom coach trade.

The new Lemoine type front axle is of chrome vanadium steel throughout and the rear axle has double inclosed internal brakes and drive shafts, gears and tubes of special alloy steel.

Stutz.

The 16-valve engine is in all of the models this year. The Bearcat is offered, also a new type of close coupled four-passenger, equipped to carry five persons, and a six-passenger, equipped to carry seven. The two-passenger roadster is continued.

All are mounted on a 130-inch wheelbase, except the Bearcat, which has a 120-inch wheelbase.

Minor changes have been made. The fenders and running board are slightly heavier, all models have Rudge-Whitworth wheels. An increased slant to the cushions gives an easier riding position. All bodies have curtains opening and closing with the door and of special design.

The lines are carried out practically the same as in 1918, the conventional right side drive being retained.

National.

The National Highway six and 12 are continued this year. Five body styles are offered in the 12 and four in the six. The speedster is offered only on the 12 chassis. The touring car, phaeton, roadster and touring sedan may be had in both.

The intake system, which is designed to handle heavy grades of fuel with satisfactory results, is retained. The chassis remains practically unchanged. An outstanding feature is the long cantilever springs which the National has been using for more than five years.

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Maxwell.

The Maxwell 25 has six body styles this year, a five-passenger touring body, a three-passenger roadster, a five-passenger sedan, a three-passenger all-weather roadster and a five-passenger all-weather touring car. Last year's berline, a six-cylinder, in which the driver's seat was shut off by a glass partition, is not offered this season.

The one chassis is continued without important changes from last year. The body designs have been improved in many respects, and the coupe is a real feature for a low priced closed car. The sedan is a very roomy car for a moderate wheelbase.

Much of the comfort and attractiveness of bigger and more expensive cars are found in the Maxwell five-passenger sedan. There is more room in the front compartment and the window drops are a decided improvement over not always certain straps.

Reo.

Two chassis models are made in the Reo, and there are four body types, a five-passenger sedan, a five-passenger touring, a three-passenger roadster and a four-passenger coupe.

The engine has four cylinders, with a bore and stroke of 4⅛ by 4½ inches, developing a horsepower of 27.23 S. A. E. rating. There are no important changes in the chassis from last year.

The five-passenger sedan is upholstered in French velour and morocco leather, with silver fittings and framed glass windows. The sedan is rich in novelty and charm.

The coach side lamps are distinctive and the removable glass partition back of the front seat separates the chauffeur's compartment from those in the tonneau.

Allen.

A sedan has been added to the Allen models. This is on the standard Allen 41 chassis, on which a five-passenger touring body is also installed. The bodies are roomy, low hung and splendidly furnished throughout. The engine, which is the company's own make, is a four-cylinder, with a bore and stroke of 3¾ by five inches and a piston displacement of 221 cubic inches. The electric controls and the motor driven horn control button are in unit in the switch mounted just below the wheel on the steering column, and all lock simultaneously with a Yale key.

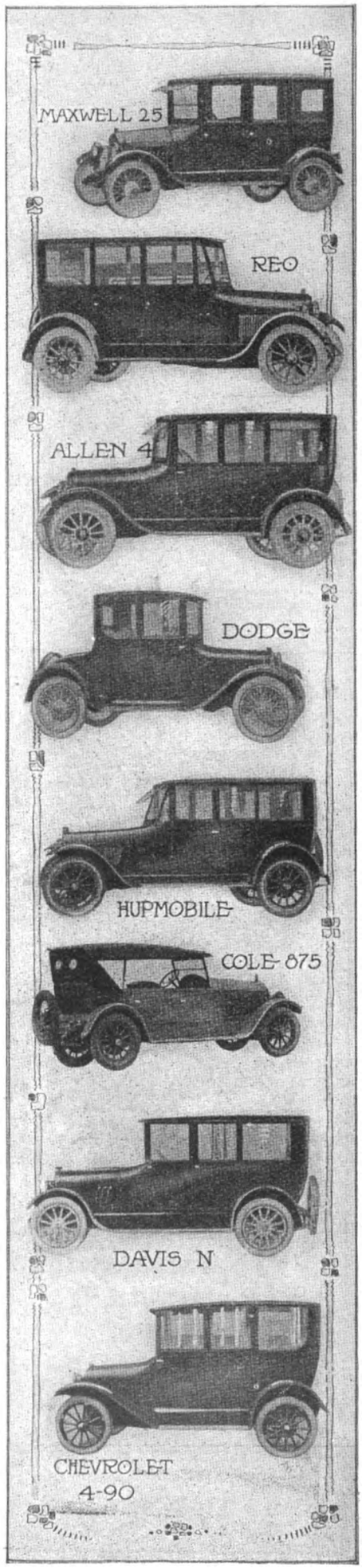
The 1919 Allen five-passenger touring car, which is attractive in the medium priced class, pleases with its clean construction and graceful lines.

The Allen five-passenger sedan meets all demands for social and family use and in serving the business and professional man.

The rear system of the Allen has long, flat under load springs, giving riding ease; helical pinion and ring gear driving noiselessly, and large, easy acting brakes.

Dodge.

In the Dodge Brothers standard chassis model six body types are offered, a five-passenger limousine, a two-passenger roadster, a five-passenger touring car, a five-passenger sedan and a five-passenger taxicab. The engine is four cylinders,



with bore and stroke of 3⅞ by 4½ inches. The wheelbase is 114 inches.

The Dodge Brothers' sedan and coupe are attractive models of the medium priced class. Freak ideas have been avoided in the body designs. The coupe is roomy enough for three persons, and ample room has been provided in the rear to carry sufficient baggage for a week-end tour.

Hupmobile.

The series R car is again offered this year. The engine is four cylinders. The wheelbase is smaller than the previous series, but, due to the shorter engine and elimination of the cowl tank, as much room is provided. The wheelbase is now 112 inches.

A complete hot air arrangement takes care of low grade fuel. There is a detachable engine head. Four body types are offered, a four-passenger coupe, a five-passenger sedan, a three-passenger roadster and a five-passenger touring.

Cole.

All of the Cole models are mounted on the standard Cole "Aero-Eight" chassis. Improvements have been made in the original aerotype design. Six aerotype models are offered, a four-passenger, a four-coupe, a four-passenger town car, a four-passenger sporster, a seven-passenger tourster, a two-passenger roadster and a seven-passenger four-door toursedan.

The Cole "Aero-Eight" cars retain practically the same appearance as last year, but show many minor improvements, which enhance the attractiveness of both the open and closed models.

The roadster accentuates the straight line effect of the aerotype body, and is finished in a naval gray, with gray fenders. On one side is a golf compartment, and a baggage receptacle on the other.

The Cole tourster has a rich blue body with wheels to match. The closed models show attractive designs and the best appointments.

Davis.

Two new closed models have been added to the Davis series. One of these is a four-passenger coupe and the other a seven-passenger sedan, having four doors. There are seven body designs fitted to two chassis.

Each of the chassis models has a Continental engine, with a bore and stroke of 3.25 by 5 inches for the 119-inch wheelbase chassis and 3.5 by 5 inches for the 124-inch wheelbase chassis. Each model has the Hotchkiss drive.

Chevrolet.

Chevrolet this year offers the model 490 in a five-passenger touring car, a two-passenger roadster, a two-passenger coupe and a five-passenger open sedan.

There are three body types for model FB, a five-passenger sedan, a five-passenger touring car and a two-passenger roadster.

The engine in both has a bore and stroke of 3 11/16 by 4 inches, developing 21.72 horsepower, S. A. E. rating.

Model FB has a wheelbase of 110 inches, 33 by 4 tires and a vacuum fuel feed. Model 490 has a wheelbase of 102 inches, 30 by 3½ tires and a gravity fuel feed. In other details the chassis agree as to units.

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Court Says Business Men Must Class As Chauffeurs

A decision of the court in Fall River, Mass., may make it necessary for traveling salesmen, agents of business houses, officers of corporations and others, who are accustomed to drive motor cars supplied to them and owned by their employers, to take out chauffeurs' licenses. It does not matter that such persons receive no part of their compensation because they drive cars; the fact that they do drive cars of their employers in connection with business makes them chauffeurs, according to the Fall River ruling.

The decision was in a case in which David Sisson, special agent of the Standard Oil Co. in that city was the defendant. He was found guilty and fined $1 and the Standard Oil Co. promptly entered an appeal, with the intention of getting a final decision of the question.

Mr. Sisson had a private operator's license, as do most people who use cars supplied by their employers in connection with business, but who do not consider themselves in any sense professional chauffeurs. He was driving through a street in Fall River on Feb. 10 when a horse hitched to a buggy turned quickly from the curb and ran into the automobile. The driver of the horse went away, but Mr. Sisson, in accordance with the law, reported the case to a policeman, who asked for his license. When Mr. Sisson produced his private operator's license the policeman said he should have a chauffeur's license and arrested him for driving without a proper license. There was a hearing in the Fall River court Feb. 20 and the court ruled that "any employee using an automobile in the business of the employer must have a chauffeur's license."

The attorney for the company told the court that Mr. Sisson was its agent and had no duty, obligation or order to drive the automobile for the company and that the car was for his convenience to use or not as he saw fit. The court held, however, that because he did use the automobile in the interest of the company his salary included his services for driving. The company stated that his salary would be the same whether he operated a car or not, but the court found him guilty and assessed a fine of $1. The case will come up before the Superior court in June.

This case raises a point that has never been definitely ruled upon. The law defines a chauffeur as "any person who operates a motor vehicle and who directly or indirectly receives pay or any compensation whatsoever for any work or services in connection therewith, except only manufacturers, agents, proprietors of garages and dealers, who do not operate for hire." Motor car salesmen may also be exempted. The Highway Commission has not made any hard and fast rule, leaving the question of the kind of license largely to the applicant, though in cases where it was plainly evident that the applicant intended to drive primarily as a means of livelihood it has required him to have a chauffeur's license. Some of the commission's own employees, who use cars owned by the state, have private operators' licenses and some have chauffeurs'.

If the Fall River decision should be sustained it would mean that a large number of men, who have considered the operation of the motor cars they use as only incidental to their business, will be classed as professional chauffeurs and will have to pass the state examination.

NEW AUTO CLUBS FOR CITIES IN NEW YORK STATE.

There will be new automobile clubs in Syracuse, Rochester and Buffalo, affiliated with 121 other automobile clubs of New York state, now composing the New York State Automobile Association, if the plan carries successfully, and indications are that it will. Herbert W. Baker, secretary, and other officials of the New York State Automobile Association have been working on plans for membership campaigns in Syracuse and Buffalo, which will be put into effect at once. Permanent headquarters will be established in each of these cities as soon as organization is completed.

HEROES PAY HIGH TAX FOR JITNEY BONDS.

Wounded soldiers, unable to find work, are said to have been fleeced by professional bondsmen who exacted unduly large payments for furnishing bonds required to get a jitney license in Rhode Island. The General Assembly will be asked to enact legislation that will be of assistance to discharged soldiers and sailors requiring bonds.

CLEVELAND AUTOMOBILE CO. TO MAKE SMALL CHANDLER.

Practically all of those interested in the new Cleveland Automobile Co. are officials of the Chandler Motor Car Co. The new concern, which has $1,400,000 capitalization, will make a six-cylinder car, which will sell between $1000 and $1400, and will be, in many ways, practically a smaller Chandler.

MINNESOTA STATE ASSOCIATION ELECTS OFFICERS.

The Minnesota State Automobile Association has elected these officers: President, E. T. Winship, Owatonna; vice presidents, J. J. Hilbe, St. Cloud; G. A. Kortsch, Alexandria, and J. S. Scribner, Walker; treasurer, J. K. Martin, Little Falls; secretary, G. Roy Hill.

ELGIN WHOLESALE SALES MANAGER.

W. H. Crowley has been appointed wholesale sales manager of the Elgin Distributing Co., Inc., to take charge of sales in New York, Connecticut, New Jersey and Northern Pennsylvania.

Industry's Leaders Say Prosperity Is Certain

Optimism radiates throughout the entire automobile industry in the United States, and automobile men are unanimous in predicting that this year will prove a record breaker in point of sales and general prosperity for every one connected with the industry. Here is what they say:

Charles Clifton, president of the National Automobile Chamber of Commerce —For the year 1919 there should be a potential market for 3,000,000 cars, but not more than half of this number will be produced. In all probability, and by summer, many persons will be wanting cars who will have to go without or content themselves with machines that have already been in service too long and should go to the junk dealer.

F. E. Bradfield, secretary and sales manager of the Velie Co.—There is no question but what the demand for automobiles this year will greatly exceed last year. It appears that there will be a greater demand for automobiles than can be filled.

John N. Willys, president of Willys-Overland, Inc.—The outlook immediately before us is most encouraging. There is no reason why we should slip back from the peak production which was reached before the war.

J. D. Mansfield, general sales manager of the Dort Motor Car Co.—Bigger, better and firmer business conditions loom up as we stand on the threshold of a new year and of a new age in the world. We are going to see more automobiles sold in the future than in the past, and they are going to be sold on a better basis.

Frank S. Ansted, president of the Lexington Motor Co.—Although devoting practically its entire energies to the production of war materials during the last year and a half, the industry has made marked strides. Many manufacturers increased their capacities from 25 to 50 per cent. It is certain they will not return to a pre-war basis of production with these facilities at hand.

T. J. Toner, director of sales of the Maxwell-Chalmers Motor Companies—In the last two months I have had across from my desk in our Detroit factories the biggest and best informed automobile men in the United States. Thus when I state that the motor car demand already has set in and that a few months may see thousands of buyers paying premium prices for their cars, I reflect not alone my own judgment, but as well the judgment of the best informed men in every section of the United States.

Edward S. Jordan, president of the Jordan Motor Car Co.—This is the year for the dealer. Never before has he had better prospects and better markets. Nearly every class of Americans are more prosperous than ever before. They all will buy automobiles this year, many of them their first car.

G. A. Kissel, president of the Kissel Motor Car Co.—The automobile show this

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year finds America with more wealth, mineral and agricultural, than in the whole of Europe, and we will start more prosperously and with much greater possibilities than any other nation on the globe. It is up to the motor car industry, manufacturing, wholesale or retail, to make out plans for getting our just share of business.

H. A. Briggs, general sales manager of the Studebaker Corporation—It will probably be several months before automobile production in general can be increased enough to take care of the big post-war demand, foreign as well as domestic.

A. G. Southworth, manager of the New York branch of the Buick Motor Co.—There has never been a moment's doubt in our minds that peace would bring a greater demand for good automobiles than ever. Our business for January has justified our views, for we took more orders and delivered more cars than ever before in January.

S. E. Ackerman, sales manager for the Franklin Automobile Co., Syracuse, N. Y. —With greatly increased production, large markets are required, and these are readily available through the greatly increased buying powers at home and the pressing need for American products abroad. With our company these conditions are already being felt. Even though our productive effort has been especially vigorous, the demand exceeds the supply by a large margin, and the pressure is increasing every day.

AUTO ACCIDENTS IN IOWA IN 1918 TOTAL 3000.

The Service Bulletin of the Iowa Highway Commission states that there were 3000 automobile accidents in 1918, with 237 deaths and 3450 persons suffering mangled bodies and broken bones in Iowa. "The death list," states the caption of the bulletin's article, "reads like war casualty record. Reckless and careless drivers menace on the Iowa highway. Railroad grade crossing takes toll of 62 lives, 19 of them during July."

These records were made up entirely of newspaper clippings which come into the office of the Highway Commission. There probably were more accidents and more injured, but probably the death list is complete.

"Children at the wheels of motor cars are a serious danger on the highways," states the bulletin. "A motor car, these accounts show unmistakably, is too dangerous an implement to be trusted upon the highways in charge of a child. It would save lives and many serious injuries every year if the state law should absolutely forbid children under 16 years of age driving on the public highways, even though accompanied by persons of more mature age. Sitting beside a child driver does not prevent the danger to the public. Children should not be allowed at the wheel of a car under any circumstance.

"The licensing of drivers and the revocation of the license for offenses of any kind and especially for driving when intoxicated, would also remove much danger from the highways."

Aeroplane Engines Not Adapted for Automobiles

Howard C. Marmon, in a paper read at the annual meeting of the Society of Automotive Engineers in New York, said that he did not believe the experience acquired in the building and operating of airplane engines during the war were likely to materially affect the design of automobile engines.

He says that from the delivery of the fuel by the carburetor to the delivery of power by the crankshaft the operation of the two types of engines is identical, so that one might expect that a reduced size of airplane engine could at once be utilized in an automobile. He demonstrates that the successful airplane engine would not meet our usual expectations for the following reasons:

1. The airplane engine, owing to its overhead valve gear and relatively loose fitting, is quite noisy, a condition which makes it undesirable for automobile use.

2. Carburetion in the airplane engine is such as to meet the requirement of but a limited degree of flexibility, while in the automobile engine it is required to operate through a wide range of speed.

3. The airplane engine needs to develop its full power at one speed only, while the automobile engine is expected to deliver full torque at any speed and without vibration.

4. The airplane engine receives expert attention at frequent intervals, while the automobile engine is expected to run for long periods without attention. It is usually handled by a person who is not a good mechanic.

5. The airplane engine is always supplied with a light volatile fuel allowing carburetion at elevations of 15,000 feet where the compression pressure is reduced 40 per cent., while the automobile engine is supposed to handle lower grades of fuel without trouble.

6. The airplane engine in order to meet the demand for minimum weight, is usually provided with steel cylinders with jackets welded on. This construction is expensive, takes up more height than is allowed in an automobile where the cylinders are grouped compactly, and necessitates planing the valves in the head, which leads to a noisy valve gear.

7. The airplane engine, to save weight, has a light crankshaft made of high grade expensive steel, which will vibrate under full power, while in the automobile engine it is found advisable to use a heavier and stiffer shaft, in order to minimize vibration.

8. The airplane engine usually operates in a dust free atmosphere, whereas the automobile is exposed to the dust and dirt near the ground and must, therefore be constructed as nearly dustproof as possible.

9. The rotative speed of the airplane engine is about half of that of many automobile engines.

It is evident from this comparison that for the best possible results each type of engine should be especially adapted to meet the conditions peculiar to its application. There is no advantage derived in trying to use one in place of the other. Mr. Marmon feels, however, that the exacting manufacture of airplane engines has helped to raise the standard of workmanship in many automobile shops and that the automobile engine will thus be benefited and perform better in future than in the past.

REGISTRATIONS PASS 100,000 MARK IN BAY STATE.

Passenger motor car registrations in Massachusetts have passed the 100,000 mark. The registrations are five or six weeks ahead of last year.

The number of trucks registered is approaching 30,000, and more than 2000 manufacturers and dealers have been registered. In addition, 3600 motorcycle plates have been given out, making a grand total of over 130,000 sets of plates for 1919 issued.

The state has received from motorists in fees and fines $1,283,639, which is 36 per cent. advance over the receipts to March 1, 1918. It is nearly double the receipts in the same period in 1916 and almost three times the receipts to March 1 in 1914.

The Massachusetts Highway Commission gives credit for the tremendous gain to the wonderful weather of the past winter, but it also shows the growing automobile business.

The growth is shown in the receipts as follows:

March 1, 1914	$443,002.75
March 1, 1915	550,597.75
March 1, 1916	670,887.00
March 1, 1917	883,608.75
March 1, 1918	943,861.35
March 1, 1919	1,283,639.40

FRENCH MANUFACTURER MAKES LOW PRICED CAR.

A low priced car to compete with American cars has been put in the market in France by a French manufacturer. The car is made by Andre Citroen, who heads a large firm that was devoted to the making of munitions during the war. Beginning late in April, it is announced, the output will be 500 cars daily.

The price will be approximately $1300 and the car will be made in coupe, runabout and delivery wagon.

There has been fear in France that American manufacturers would unload on the French market large numbers of army cars at low prices.

CHANDLER EARNED $21 A SHARE IN 1918.

The Chandler Motor Car Co., Cleveland, O., manufactured and sold approximately 9750 passenger cars in 1918, and 15,000 in 1917. The earnings aggregate $21 a share despite the curtailment.

EMPIRE TIRE DIVIDEND.

The regular quarterly dividend of 1¾ per cent. on the preferred stock, payable on stock of record Jan. 1, has been declared by the Empire Tire and Rubber Co.

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ACCESSORIES, EQUIPMENT AND TOOLS FOR THE GARAGE AND REPAIR SHOP

Automobile Varnish,. A very attractive finish can be given a car with Norwesco color varnish. Only one coat of varnish is necessary and this will dry in from 12 to 15 hours. The color is ground into the varnish and gives a particularly brilliant



finish. Only the very best of materials are used in making these varnishes. They will not chip, scale or peel. The colors are green, blue, gray, red, tan, orange, black and clear.

Manufactured by the Northwestern Chemical Co., Marietta, O. Price, pint cans, 85 cents; quart cans, $1.50.

Essenkay. The tire filler idea is growing rapidly. Car owners everywhere welcome the opportunity to replace the inner air filled tubes with tire filler. With Essenkay, it is claimed, punctures and blow-



outs are impossible, tire mileage is doubled and there is no expense for inner tubes, extra tires or rims, pumps, jacks or tire repair kits.

Essenkay filled tires wear down to the last layer of fabric and Essenkay can be used again in new tires. Essenkay is an elastic, resilient, durable composition. It is not affected by heat, cold, atmospheric or climatic conditions. It contains no rubber and therefore cannot harden, oxidize or bloom.

It is for both pleasure car and truck. A 10 days' free trial is offered to truck owners.

Essenkay filled tires with stationary rims weigh less than demountable rim equipment.

The Essenkay Products Co., Grand Ave., at Orleans St., Chicago, Ill. Write for literature and prices.

Peerless Automobile Specialties comprise different products for all parts of an automobile and fill a vacancy that has existed in the field of automobile repainting and upkeep. The specialties are suitable for use on both the high priced and the less expensive cars. These goods enable a motorist to turn out a job complete in every respect, not only finishing the body and wheels, as in the past, but also allow him to dress the cushions and top, finishing the cylinders, lamps, etc.

This line of products originally started with one item, Peerless Mohair Top Dressing, and has grown until the line contains 28 items, so that any jobber or dealer who stocks goods of this character can pur-

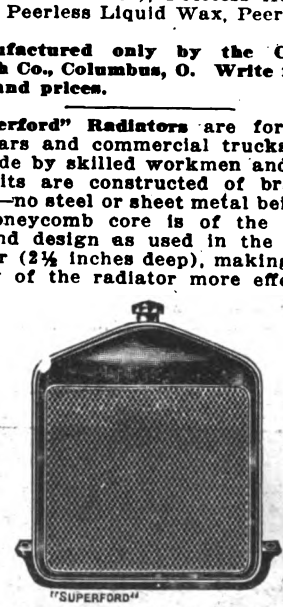


chase all from one manufacturer and have them in one uniform style package.

The Peerless Automobile Specialities include Peerless Mohair Top Dressing, Peerless Lamp Enamel (gloss and dull), Peerless Jet Black Fender Japan, Peerless Cylinder Enamel (black and gray), Peerless Extra Fine Black Japan, Peerless Acid Proof Battery Box Black, Peerless Ford Top Dressing, Peerless Anti-Rust Rim Paint, Peerless Shellac, Peerless Leather Top Dressing, Peerless Lining Dye, Peerless Cushion Dressing, Peerless Mirroroid (a varnish renewer), Peerless Auto Body Polish, Peerless Liquid Wax, Peerless Tire Paint.

Manufactured only by the Columbus Varnish Co., Columbus, O. Write for literature and prices.

"Superford" Radiators are for use on Ford cars and commercial trucks. They are made by skilled workmen and the inner units are constructed of brass and copper—no steel or sheet metal being used. The honeycomb core is of the identical type and design as used in the Packard radiator (2½ inches deep), making the efficiency of the radiator more effective in



cooling than the ordinary Ford radiator. These radiators are built in two models. No. 16 "F" fitting 1912 to 1916 Ford cars and model No. 18 "F" fitting 1917-18 Ford cars. Both types are features by having detachable casings, which can be taken off at will should the occasion arise, making them a two-unit construction.

Manufactured by the Superior Lamp Manufacturing Co., 136 W. 52nd St., New York City, N. Y. No. 16 "F," price $28; No. 18 "F," price $30.

Boyce Moto Meter. The new "Universal" model is smaller than the "Standard" $10 model, yet larger than the "Junior" $5 model. It is protected with beveled crys-



tals. The "Universal" stands out boldly on top of the radiator cap, on the line of your vision with the road. Its handsome open face is easily read.

The "Ford" model, which has the name, "Boyce Moto Meter" at its top, will signal the driver of a Ford that more water is needed in the radiator 10 to 15 minutes before the radiator needs filling. It will indicate the need of lubrication long before the motor needs it. It adds to the appearance of the car.

Manufactured by the Moto-Meter Co., Inc., Long Island, N. Y. Prices: "Universal" model, $7.50; "Ford" model, $2.75.

Universal Hose Clamps will fit any size hose. These clamps have a wide range of usefulness. They fit in size and



adjustment any hose requirement, large or small. They are simple, strong and convenient.

Manufactured by the Universal Industrial Corporation, Hackensack, N. J. Write for prices.

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Magneto Oil. The magneto is one of the most vital parts of a motor equipment. Many of the ignition troubles are caused by poor lubrication, which can be eliminated by the use of Blue Ribbon Magneto Oil. This oil gives the correct lubrication



necessary for magnetos, generators, commutators, speedometers, springs and delicate bearings and contact points, as it carries the exact viscosity and gravity to keep the gears and bearings in proper condition.

Manufactured by the International Metal Polish Co., Inc., Indianapolis, Ind. Price, 25 cents.

Aluminum Bronze, a Norwesco specialty, is a powerful heat resistant and is particularly adaptable to all metal surfaces which are subject to heat. It is



splendid for use in dressing up the engine, muffler or radiator. It comes ready mixed for use.

Manufactured by the Northwestern Chemical Co., Marietta, O. Price, half pint cans, 65 cents.

Mohair Top Dressing and Lining Dye, a Norwesco specialty, is an easily applied preparation that penetrates, waterproofs and preserves the fabric. Recovering a mohair top is seldom necessary just because it is leaking here and there through pinholes and worn creases, or because it



has become faded and streaked. Norwesco Mohair Top Dressing and Lining Dye will make it rain tight and new looking again. It restores the original black, silken sheen and color, leaving a soft, pliable top with a durable finish that is impervious to water.

Manufactured by the Northwestern Chemical Co., Marietta, O. Price, pint cans, 75 cents; quart cans, $1.25.

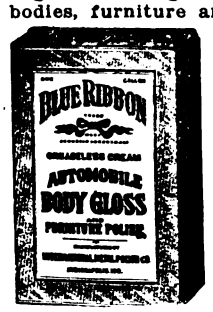
The Guide Motor Lamp is a special new type heavy duty electric truck head lamp. This lamp is of the same size as has been used on class "B" U. S. trucks, but of much simpler construction, much cheaper and is equipped with a special front lens. The most important feature about the lens is that it is designed to project a clear, wide ray of light directly on the ground, eliminating the glare above the three foot limit, and with the 180 degrees spread to the sides it gives the desired light on the sides for turning, getting into difficult dark alleys and driveways, etc. It is absolutely dust, water and rattle proof. While the brackets are of the standard fork type of six-inch centers, it is subject to a small range of latitude. If necessary it can also be provided with the class "B" type of brackets. The compliments the Guide company have received from the few truck engineers who have had a chance to see it would indicate that



this type will meet with great success. Can take care of medium sized jobbers' orders.

Manufactured by the Guide Motor Lamp Manufacturing Co., Cleveland, O. Price quoted on request.

Blue Ribbon Body Gloss and Furniture Polish is an excellent reviver and renewer of varnish, enamel and finish. This polish is just the thing for cleaning and polishing automobile bodies, furniture and all high-



ly finished wood or enameled surfaces. It keeps the car or fixtures always bright and new. It leaves no grease to catch dust.

Manufactured by the International Metal Polish Co., Inc., Indianapolis, Ind. Prices: Six ounce can, 30 cents; one pint, 75 cents; one quart, $1.25; one-half gallon, $2; one gallon, $3.50.

Lyon Resilient Bumper. The Lyon Resilient Bumper is built for service. It has powerful spring bumping leaves, securely joined by clips and four sturdy ⅝ inch hook bolts with a tensile strength of 10 tons each; all parts are specially heat treated to obtain resiliency and indestructibility.

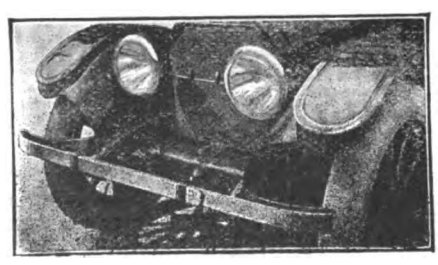
The supporting arms are an integral part of the bumper, eliminating weak joints. When a car running at 12 to 15 miles per hour bumps there is no damage to the car or bumper, just a slight recoil, and many times the cost of the bumper is saved.

The strength of the Lyon Bumper is due in part to the tempered spring steel of which it is constructed, and is the result of the selection and treatment of steel, plus the careful study of collision impact and years of experiments to find the prevention.

The Lyon double loop, double front patented adjustable construction is simplicity itself, and this feature together with our patented Lyon Three-Way Bumper fitting enables jobbers and dealers to carry a single type of bumper for practically all makes of cars.

The Lyon Bumper not only fits every car perfectly, but retains its position under all conditions.

Manufactured by the Metal Stamping Co., Long Island City, N. Y. Prices: Large size cars, $14.50 to $16.50; medium size cars, $12.50 to $14; Ford cars, $10 to $12; Rear Bumpers, $10 to $14.



Goodrich Lockswitch. The Goodrich Lockswitch protects the Ford car as one would protect other valuables put under lock and key. It is easy to obtain, cheap to buy and easy to attach. The lock is the famous Yale lock. The same turn of the key that shuts off the ignition also locks the car and safeguards it against theft. Each key is individual. The switch lock housing is made of a special ductile metal, a special alloy, that can be bent by severe blows but not broken.



The screws by which the Lockswitch is attached to the coil box cannot be removed because of the exclusive Goodrich shutter construction. The screw heads are covered by hardened metal shutters when the switch is locked. The Lockswitch has been approved by the Underwriters' Laboratories. A ground contact concealed within the switch makes it impossible for the thief to rewire back of the dash and thereby start the engine.

Manufactured by the Goodrich-Lenhart Manufacturing Co., Widener building, Philadelphia; factory, Hamburg, Pa. Price, complete, $3.50; Canada, $4.50.

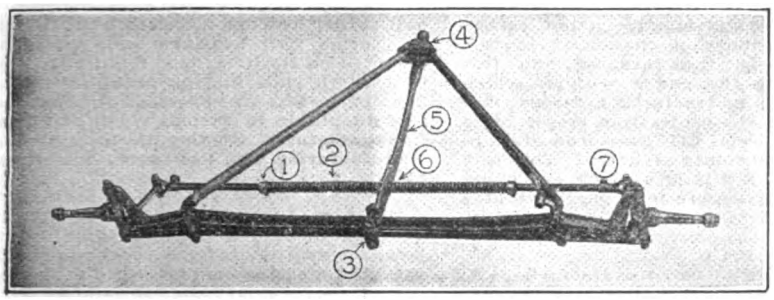
Wrenches for Ford Cars. This is a set of engineers' wrenches that will prove handy to the owner of a Ford automobile. The tools are durably made. It con-



sists of five wrenches, with 10 openings. The set is especially designed for Ford chassis work.

Manufactured by Frank Mossberg Co., Attleboro, Mass. Write for prices.

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"Hold 'Em in the Road" is a combination of four of the most important attachments of the Ford, and is insurance against a broken rod. It is a combination of radius rod brace, anti-rattler, axle support and steering device.

The "Hold 'Em in the Road" attachment consists of a center brace running from the center of the axle to the rear of the radius rods and having a hole through which the tie rod passes. The springs, one on each side of the center brace, encase the tie rod and are held in place at the outer end by set collars. The device is bolted tight with the wheels lined up straight ahead.

The attachment stabilizes the turn of the front wheels, prevents wear and tear on all parts of the front axle, steering gear and tires, braces the radius rods and prevents the tie rod from rattling.

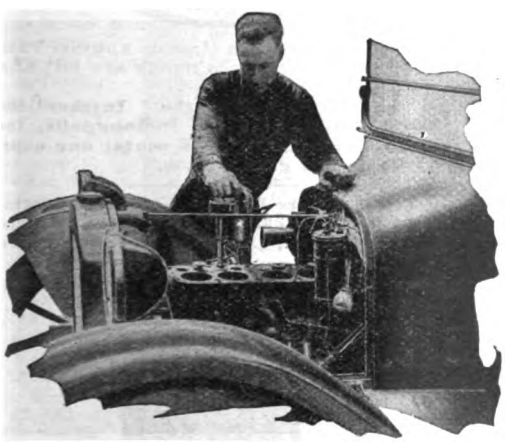
Manufactured by the Cooper Auto Supply Co., Thomasville, Ga. Price, $5. Dealers' orders will be filled through nearest jobber.

Jackson Electric Valve Grinder. The No. Four Jackson Electric Valve Grinder was developed principally to meet the most severe army service and has been extensively used in the aviation and army transport divisions, as well as by manufacturers of motors for such service. Its efficiency, durability and dependability have been thoroughly proven.

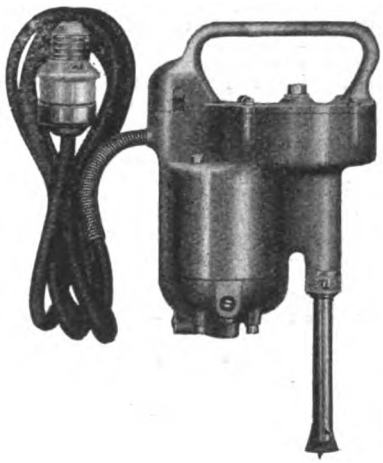
The advantages claimed for this tool include: Saving of 60 to 80 per cent. of time required to properly perform the same operation by hand; due to rapid uniform oscillating motion, a seat more perfect than is possible to obtain by hand is assured; does not require expert labor to produce excellent results; designed solely for the purpose of grinding valves.

Its capacity includes valves up to 3½ inches in diameter. It weighs six pounds. The motor is of special design, operates either on direct or alternating circuits, consumes approximately 75 watts. The casing is constructed of a tough aluminum alloy. All working parts, motor shaft and grinding shaft operate in phosphor bronze bearings. All steel wearing parts are hardened. Interchangeability of all parts is guaranteed.

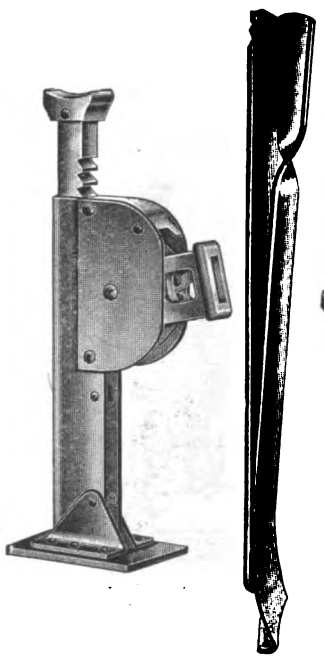
Special attachments may be obtained at slight additional cost for any of the following requirements: Liberty aviation motor, cushioned flexible chuck suitable for valve in the head construction; Buick cage valve, cushioned flexible chuck. The grinder complete is furnished with standard bits for slotted valve, spanner bit for Ford, valve lift springs, flexible cord and attaching plug.



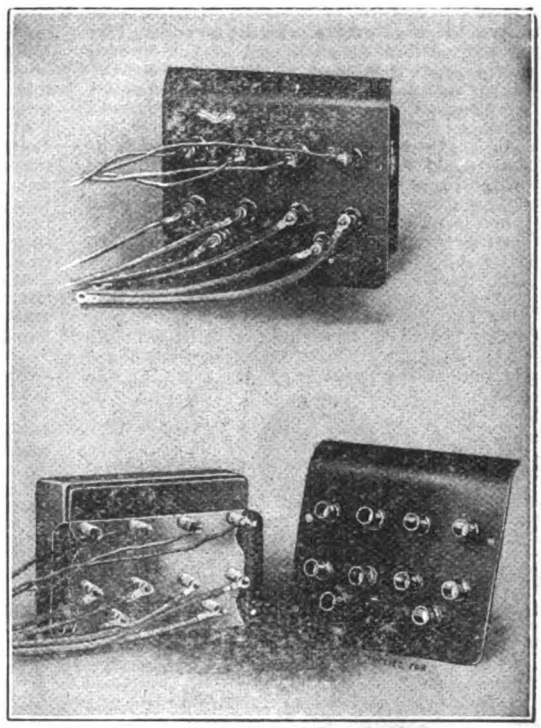
Manufactured by the Kalamazoo Railway Supply Co., Kalamazoo, Mich. Write for prices and literature.



Lane's H-C Jack. The main feature of this jack is that it is the only jack in the market that may be placed underneath the rear of the modern overhung cars with one hand at the extreme outer end of a three foot handle, operated, reversed and removed by the one hand on this handle while a person is standing in a natural and easy position, entirely out of contact with grease or oil. That the jack operates quickly and with the utmost ease are also favorable features, but the dominant fact is that with the Lane H-C Jack one entirely avoids getting underneath the car.



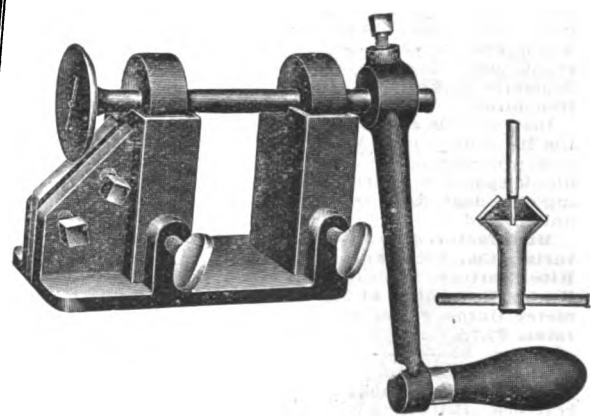
Manufactured by Lane Brothers Co., Poughkeepsie, N. Y. Prices, $4.50 to $14.



"Casco" Metal Coil Box Protector. Wet coils have been a prolific source of trouble and expense in the past, causing break downs, delays, repairs and various other difficulties. The "Casco" Coil Box Protector is to prevent such results by eliminating the cause. It is to keep rain and dampness from reaching the coils, insuring these vital parts of the car against any possibility of damage arising from the presence of moisture. It can be installed in a few moments without the aid of a mechanic. More than 30,000 of these were sold during the first 60 days on the market.

Manufactured by the Cooper Auto Supply Co., Thomasville, Ga. Price, $1.

Valve Facer and Valve Seater. Repairing automobile engines is an important job and the saving of time, labor and expense interests not only the repair man, but also the car owner. To keep the gasoline engine in perfect running order it is of first importance that the valves fit their seats and are free from leakage. They should be refaced and reseated after the engine has run at least 5000 miles to prevent loss of power and waste of gasoline.



The tools here shown, a valve facer and a valve seater, are all that is required to reface and reseat any and all sizes of valves and seats.

An attractive proposition is offered to local distributors or dealers.

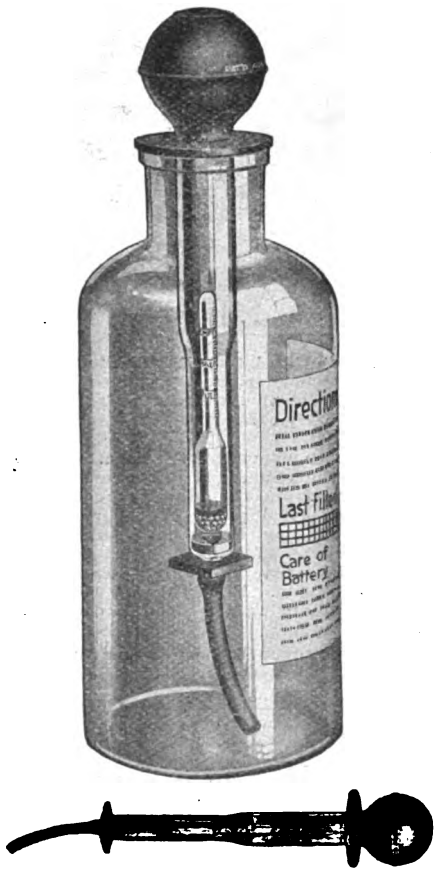
Manufactured by S. D. Hartog Manufacturing Co., 2638 Locust St., St. Louis, Mo. Pamphlet and prices on request.

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Workrite Battery Hydrometer. The rubber collars at each end of the hydrometer protect it from striking and breaking, if accidently dropped. The square collar prevents rolling if laid on an uneven surface. The slotter rubber washer inside the tube is a cushion for the float and prevents the float from stopping the outlet hole.

The float is always in plain view, and there is no plug in the bottom to drop out, spilling the acid and breaking the float. All rubber fittings are made of unusually high grade stock, insuring strong suction and long life. The graduations on the float are guaranteed accurate.

The Workrite Hydrometer outfit consists of the standard WorkRite Hydrometer described above fitted in a glass jar of one



quart capacity, for keeping distilled or pure rain water. Thus the hydrometer and water are always clean and ready for instant use. The large collar on the hydrometer makes the jar dust and evaporation proof.

Instructions for testing the battery and for its proper care both winter and summer are printed on the label. Numerous blank spaces are also provided for recording the last date the battery was filled and tested.

Manufactured by the Workrite Manufacturing Co., Cleveland, O. Prices: WorkRite Battery Hydrometer, $1; west of Rocky Mountains, $1.25; WorkRite Hydrometer Outfit, $1.50; west of Rocky Mountains, $1.75.

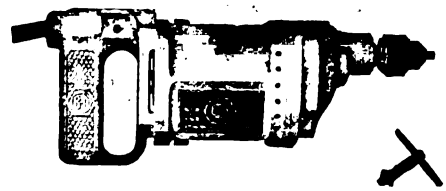
Gill Piston Ring. The Gill Piston Rings are made for trucks, pleasure cars and tractors. Gill rings will adjust themselves to oversize or worn cylinders within any reasonable limits and will still be tight, on



top, bottom and both sides. The wastage of oil and gas is enormous, and can be readily overcome if Gill Piston Rings are used. The construction of these rings is such that the gas simply cannot escape from the combustion chamber. Perfect compression is thus assured and this means getting the power without which any car, truck or tractor is a failure. Gill Piston Rings are made from single piece castings of special fine gray iron and are machined to absolute accuracy. They can open from ⅛ to 3/16 of an inch, according to size of ring, before loss of compression can occur, thereby adjusting themselves to oversize or out-of-round cylinders within reasonable limit.

Manufactured by Gill Manufacturing Co., 351-359 W. 59th St., Chicago, Ill. Schade-Phelps Corporation, 1864 Broadway, New York City, eastern distributor.

New Size Drill. A new size drill has been designed and is now ready for delivery by the manufacturers, the Black & Decker Manufacturing Co., Baltimore, maker of B & D Portable Electric Drills "with the pistol grip and trigger switch." This drill, which is especially designed for drilling holes in steel, iron or wood, is equipped with a series compensated motor and has a no-load speed of 1600 revolutions per minute, full-load energy con-



sumption of 175 watts at which the speed is 1000 revolutions per minute.

It is four inches in diameter and 12 inches over all and will take any size drill up to 3/16 inches diameter. This drill is perhaps the lightest weight drill of this capacity made, weighing only 6⅝ pounds, and for this reason its use is most satisfactory.

Manufactured by the Black & Decker Manufacturing Co., Baltimore, Md. Prices on request.

Electric Valve Grinder. Is a new tool made by the Black & Decker Manufacturing Co., Baltimore, Md., of rather unusual design and construction. It is an electric driven motor device with an oscillating spindle and supplants the old laborious method of valve grinding by hand. The spindle oscillates with a long, steady sweep similar to the movement obtained in grinding by hand, but many times more rapidly. The patented Black & Decker "Piston Grip and Trigger Switch" is embodied, making it possible to operate and control this grinder in an unusually convenient manner. A one-sixth horsepower motor is used, which is air cooled. It operates on standard power circuits either alternating current with range 25 to 60 cy-



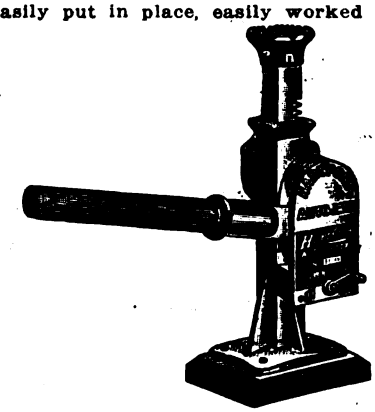
cles or direct current, being made for circuits of 110 volts, 220 volts and 32 volts.

The motor and gearing with reciprocating mechanism are completely enclosed in an aluminum housing, the gearing and oscillating movement being separated from the motor compartment and packed in grease. The grinding spindle runs in a ball thrust bearing. Armature shaft runs on Norma ball bearings and gears are mounted on shafts ground to size supported at both ends in long phosphor bronze bushings. Bits are provided to make the tool adaptable to various types of valves.

Manufactured by the Black & Decker Manufacturing Co., Baltimore, Md. Price, $45.

Hartford Auto Jack. The Hartford is built to meet the demand for a better jack. A swifter, safer, stronger jack. Its patented gearing makes child's play of lifting the heaviest car; 15 pounds pressure on the handle is transformed into a lift of 1000 pounds at the head.

Hartford has a long handle for convenience and a short stroke for safety. Easily put in place, easily worked when



there. No danger of barking knuckles on ground or car. It has a broad base—for safety and stability on any surface.

Gears are solid steel, machined and hardened. All moving parts encased—dust proof and water tight. Finished in lustrous black enamel. Fully covered by the Hartford guarantee: "Satisfaction or money back."

Manufactured by Edward V. Hartford, Inc., Jersey City, N. J. Price, $8.

Cold Cream Hand Soap, a Blue Ribbon specialty, washes the hands without water and leaves the hands soft and smooth. It is just the thing for motorists on the road



after tinkering with tires or engine. There is no grit. No chapped hands are left after its use.

Manufactured by the International Metal Polish Co., Inc., Indianapolis, Ind. Prices: 10 ounce can, 20 cents; one quart, 35 cents; one gallon, $1.50.

Tire-Lac Tire Paint, a Norwesco specialty, fills the cracks and pores of a tire, creating a smooth, elastic surface, which pro-



tects the shoes and gives them longer wearing life. It is as good protection as a case for the spare tire. Tire-Lac is easy to apply and makes the tire look like new.

Manufactured by the Northwestern Chemical Co., Marietta, O. Prices, pint cans, 75 cents.

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Automobile and Furniture Polish. No matter how good the motor or how little wear your car has seen, it cannot look its true worth if its finish is dull and stained. It can be kept looking bright and new



with Norwesco Automobile and Furniture Polish. Norwesco Polish does not cut away the varnish, exposing a new bright surface. Instead, it reinforces the varnish and restores the finish.

Manufactured by the Northwestern Chemical Co., Marietta, O. Price, four ounce bottle, 30c; 12 ounce bottle, 50c.

Valve Grinding Compound. Valve grinding is a very simple matter if you go at it in the right way. A most satisfactory way is to equip yourself with a valve grinding



tool and Norwesco Valve Grinding Compound. This compound insures a tight, efficient valve and a smooth even seat with minimum time and effort.

Manufactured by the Northwestern Chemical Co., Marietta, O. Prices: Single collapsible tubes, 1½ ounces, 25 cents; double and cans containing two ounces of fine and two ounces of coarse, 40 cents; one pound cans, coarse, medium or fine, $1.

Graphite Coating Rim Paint. Tire casings often stick fast to the rims and are very hard to pry loose. This can easily be prevented by coating the rims with



Norwesco Graphite Coating Rim Paint. It dries so quickly that it can be applied while changing tires. Being rust proof, it preserves the rims and also lessens the wear on the tires. It dries in three minutes.

Manufactured by the Northwestern Chemical Co., Marietta, O. Price, half pint, 50 cents.

National Spark Plugs are designed especially to meet the demand for an efficient spark plug, with big spark power electrodes that will ignite low grade fuel satisfactorily. The patented one-inch firing surface gives seven to 10 sparks that will ignite fuel instantly.

This insures positive ignition, complete combustion and continuous service. Carbon troubles are practically eliminated and there is a great economy of fuel.

The firing wires are designed to give satisfactory service for heavy duty requirements of air, land and water service. A test of National Spark Plugs by one of the largest oil producing companies in the United States demonstrated that these



were the only make of spark plug that "stood up" under the heavy duty requirements of a casing head engine. As a result of this test National plugs were adopted exclusively for all its plants.

After rigid competitive tests by ignition experts, National Spark Plugs have been selected for use in marine motors, aeroplanes, automobiles, trucks, tractors and stationary engines, and have been commended highly for their satisfactory service.

National Spark Plugs differ from any other type of spark, and are constructed on a new principle of ignition, fully protected by basic patent.

Manufactured by the Bergie National Spark Plug Co., Rockford, Ill. Write for descriptive literature.

Soldering Salt. The work of making perfect joints with minimum expense and effort is simplified by Norwesco Soldering Salt, a "chemically correct" flux in pulverized form for use in soldering all metals. It contains no acid. It comes packed in



large necked one-pound bottles with waxed board lined screw cap. The air tight package makes it easy to use a portion of contents and preserve the remainder for future use.

Manufactured by the Northwestern Chemical Co., Marietta, O. Price, $1.

Pistons for Ford Cars. This piston (standard type) is manufactured in large quantities by the G. H. Dyer Co., which can supply them complete with step cut rings, wrist pins and bushings.

The company also makes the Dyer Lightweight Pistons for Ford cars. This is one pound lighter than the standard



Ford piston. It is made from a very close grained metal, taking a high finish. The piston is tough, durable, absolutely round, perfectly machined, and has a domed head, uniform walls, special oiling features and is accurately fitted with special lap joint rings.

The G. H. Dyer Co., 155 Brookline St., Cambridge, Mass. Write for literature and prices.

The "U-Fit-It" Storm Door Frame is for runabouts or touring cars. It is easy to adjust, open and close, get in and out of car and carry. It makes the front curtain open like a door. It eliminates



broken celluloid, soiled clothes, wet hands and winter discomfort. The cut shown herewith shows the curtain door partly open as it passes over a child on a person's lap in car.

The Midway Mechanical Co., 1555 Selby Ave., St. Paul, Minn. Write for prices and literature.

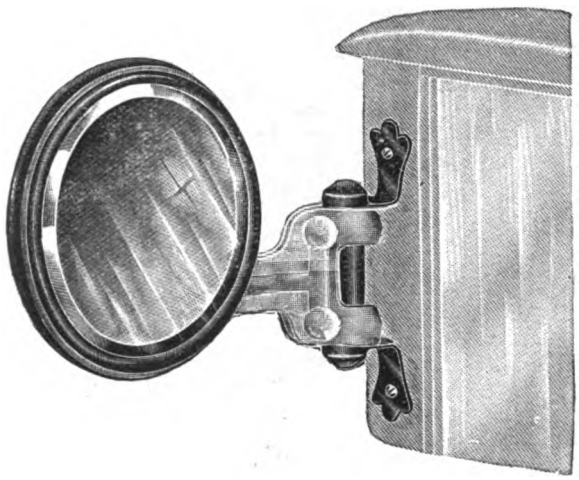
Pumice Hand Soap. A very satisfactory soap for motorists is the Norwesco Pumice Hand Soap. It scours and cleanses the hands thoroughly, but will not scratch or



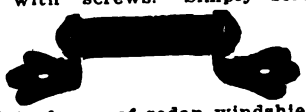
irritate the skin. It is not a grit soap. Norwesco Pumice Hand Soap, besides doing its work efficiently, is delicately scented and removes all unpleasant odors from the hands.

Manufactured by the Northwestern Chemical Co., Marietta, O. Price, 12½ ounce cans, 20 cents.

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Rosco Sedan or Limousine Mirror Bracket. This bracket converts every ordinary windshield mirror into a sedan mirror, thus eliminating the stocking of extra mirrors for sedan cars. It is furnished with screws. Simply screw on



bracket to frame of sedan windshield and clamp the mirror on the Rosco attachment as illustrated. Illustrations show the bracket and also a view of the Rosco bracket attached on a limousine body.

Manufactured by A. W. Rosen & Co., 610-614 Broadway, N. Y. Price, bracket, 50 cents.

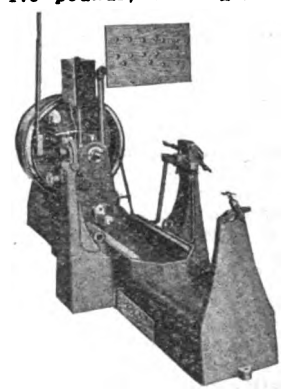
New York Security Switch Lock for All Fords. This is really a combination of two switches, one to lock the ignition circuit battery or magneto and the second the switch that grounds the entire ignition system, so that it is impossible to wire around coils or "beat" the device in any manner known to the most expert of thieves. It can be installed in five minutes on either the old style (moulded) or the new style ((all metal) switch. Your present switch is not disturbed—the wires



and attaching bolts remain the same. The strong metal housing completely covers your present switch. The attaching screws are covered by steel bars. The powerful cam forces the bars over screw heads at the first turn of key, and then keeps them there. The screw holes are always covered, so there is no chance for entrance of dirt, dust or moisture. A bronze spring short circuits or grounds the entire ignition system when the switch is turned to "off" position, completely baffling the would-be thief.

Manufactured by the New York Coil Co., 338-340 Pearl St., New York City; western factory, 1440 Michigan Ave., Chicago. Price, $3.25.

The American Combination Bearing Burning-in and Motor Test and Running-in Stand for Ford Motors is simple and positive in operation and has distinct advantages that make it practical and economical equipment for use in any shop. It requires less reduction to operate on account of the gear reduction being 3½ to one. The following is a detailed description: Length, 76 inches; weight, 985 pounds; floor space, eight square feet; gears, two inches, five pitch all steel; tryout wheel, 21 inches in diameter; speed burning-in shaft, 225 revolutions per minute; width at widest part on base, 23 inches; height of motor support posts, 24½ inches; shafting, two inches, 40 point carbon steel; pulley diameter, 18x7¼ inches; weight, 175 pounds; bearings, non-gran



bronze and nickel babbitt; speed, 550 revolutions per minute for running-in and testing motor; five to 7½ horsepower required to operate; five inch double ply belt; lubrication, grease cups on bearings; gears run in heavy oil; alignment device on right motor support post for aligning the universal joint when testing motor; clutch, three-point maple block, internal expanding; counterbalance feature will insure quick and positive stopping at any speed; equipment, one gallon gasoline tank, swinging coil dash, inlet and outlet water connections, oil catch pan, voltmeter optional.

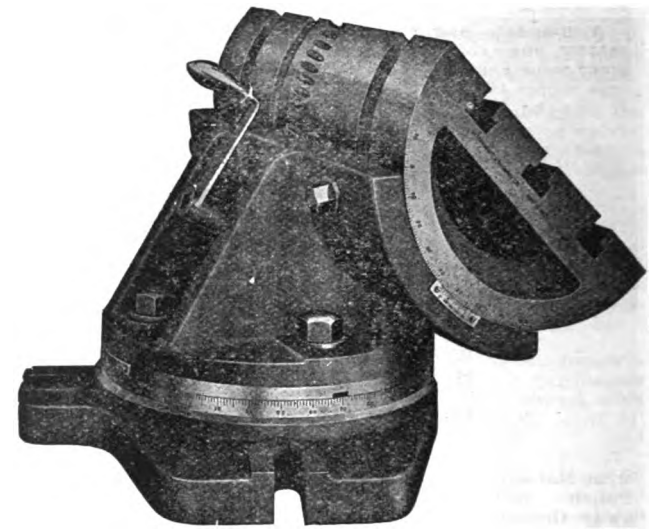
Manufactured by the Service Station Equipment Co., Inc., 1201-11 Cortland St., Chicago, Ill. Price, $350; rear axle and running-in attachment, $20 additional.

The Starrett Patent Magazine Screw Driver is fitted with four blades of different widths from 3/32 to ⅜ inch, any of which may be taken from the telescope handle and inserted in the end, where it is automatically locked and firmly held for use. The blades are carried in the handle,



where, by a spring pressure, they are held from rattling when carried in the pocket, or from being lost when the cap is off. While the cap may be readily pulled off or put on, it is rigidly held from turning and frictionaly held from coming off, with no screws to bind or bother.

Manufactured by the L. S. Starrett Co., Athol, Mass. Price, $1. Extra blades, 10 cents.



Universal Angle Plate. The value of a machine tool in any shop is dependent upon the number of times it can be used and the variety of work that can be done upon it. The Universal Angle Plate is designed to be attached to any plain milling or grinding machine, converting it into a universal tool, upon which may be done many jobs that would have been impossible without the employment of the plate. The table has an adjustment through 360 degrees horizontally and 90 degrees vertically, without disturbing work bolted to it. Graduations with Vernier attachment reading five minutes, permits of its use for especially fine work. The tool is rigid and strongly built and has unlimited possibilities of application for work in connection with lathes, planers, milling machines, shapers, drill presses and grinders.

Manufactured by Boston Scale and Machine Co., 381-389 Congress St., Boston, Mass. Price quoted at request.

Generometer. This instrument meets a universal demand by electrical repair men. The most common trouble on the lighting system is that of a defective generator armature. This instrument will enable the electrician to immediately determine whether the armature is defective and in what manner it is defective. It will detect minor troubles on the armature that can be easily fixed by the electrician himself, thus saving the time and money involved in sending it out to have it re-



wound. This instrument will be generally welcomed by the average repair man, as it will enable him to do his work with much greater efficiency and accuracy. It is a necessity in every repair shop. It is constructed and based on scientific principles. The case is in mahogany finish and measures 15 7/16 inches long, 10¾ inches wide and five inches high. It will prove to be a valuable asset in any electrical repair shop.

Manufactured by Paul G. Niehoff & Co., Chicago, Ill. Price, $30.

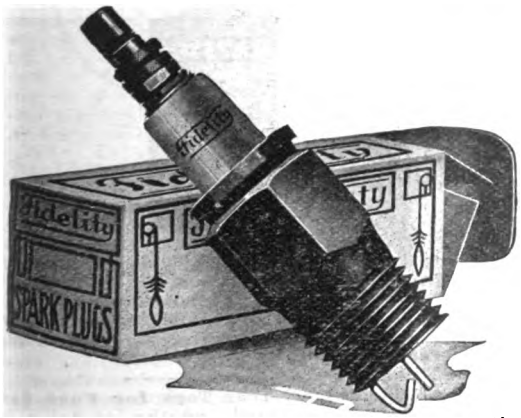
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Fidelity Spark Plug. This is one of the specialties of the New England Mills Co., Chicago. Another, illustrated, is the Fidelity Inner Tube in a rubberized silk tube bag.

The New England Mills Co. sells at wholesale only and not to consumers. It is a live wire organization, catering to progressive accessory dealers who want to boost their business.

The company takes just pride in its reputation. It is a responsible concern, with Dun, Bradstreet and other references to back it up. It has an unusually liberal guarantee. Its goods are guaranteed not only to be as represented, but to satisfy thoroughly. The buyer is the sole judge. If a dealer is not satisfied with any goods bought from the company he may return them. Not only will his money be refunded, but he will be reimbursed for all transportation charges.



The company deals in standard merchandise at low prices. It has an excellent service department, which is in charge of expert men who have specialized this line for years, and who will send the merchandise ordered, the kind expected.

The company's guarantee is backed by years of established business and by reference to any national bank in Chicago.

"The Little Salesman" is a dealer's catalogue of automobile and truck supplies which the company will send to any dealer upon application. It is a very valuable book.

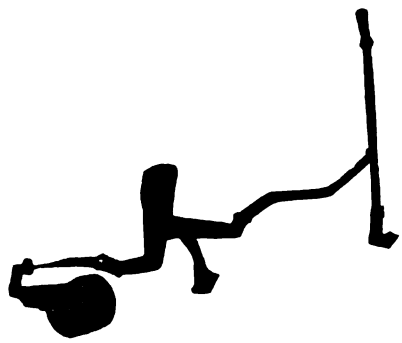
The New England Mills Co., 1219-1221 Michigan Ave., Chicago, Ill.

Barrett Motor Starter for Fords. This starter has no chains, springs, batteries or wires. All the essential parts are made of chrome nickel steel case hardened. Danger of backfire is eliminated because it automatically releases the gear on the back kick. The Barrett lever, within easy reach, enables one to master the engine from the seat and requires only one-third the physical effort of cranking. Every piece of the Barrett Motor Starter is guaranteed for five years. The complete outfit weighs only 10 pounds.

It is easily installed without changing the appearance of the car, it being completely concealed within the hood. None of the car's working parts are interfered with, and the regular crank is left in place. No power is taken away from the engine, as it is released from contact with the crankshaft as soon as the engine starts.

With this starter the car can be started in the coldest weather with ease from the seat. A special priming device, which is a part of the outfit, makes it possible to vaporize gas directly into the cylinders by pressure on the button.

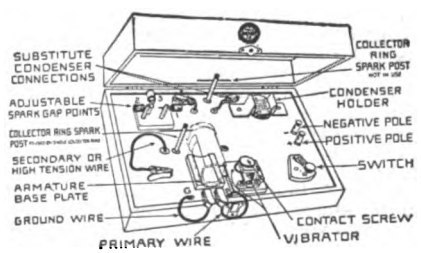
Power is derived from a lever right in the cowl alongside of the driver and operated with the left hand. This power is transmitted through the dash and by means of a solid steel connecting rod to a moveable plate, bolted to the engine case, a rock bed foundation for such a contrivance. Plate and engine case appear to be one. From the moving plate power is transmitted by a shorter rod to a set of gears, one of which is pinned solidly to the Ford crankshaft, and it is here where the application of power on



the lever finds its result in turning the engine over. A self-oiling appliance insures lubrication.

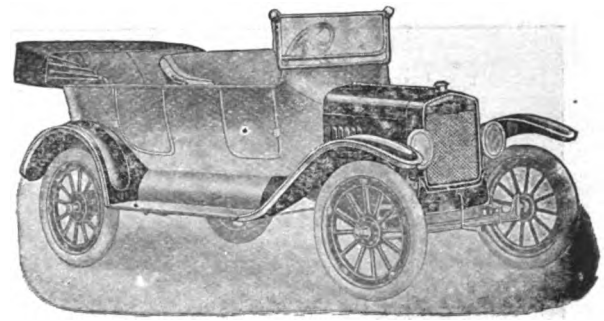
Manufactured by the Barrett Motor Starter Manufacturing Co., Inc., 1777 Broadway, New York City. Price, starter and primer complete, $25.

Defectometer. This is a new and useful device for those engaged in magneto repair work. It enables the repair man to quickly locate shorts in the various parts of the magneto. It is designed and manufactured by Paul G. Niehoff & Co., Inc.,



Chicago, who are authorities on magnetos. It is the first instrument of its kind ever put upon the market and should prove to be a valuable assistant to electrical repair men, as its possibilities are very extensive for test work.

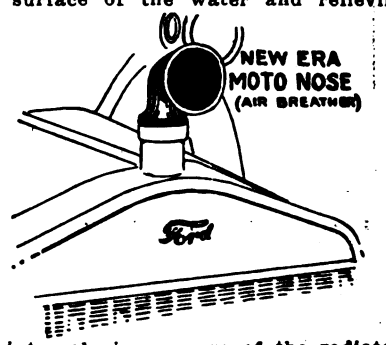
Manufactured by Paul G. Niehoff & Co., Chicago, Ill. Prices on request.



Corcoran Crown Fenders. Our illustration shows the distinctive appearance given to a Ford car by equipping it with the Corcoran Peerless attachment and crown fenders. All parts are furnished, finished with two coats of black enamel baked on.

Manufactured by the Corcoran Mfg. Co., Cincinnati, O. Price quoted at request.

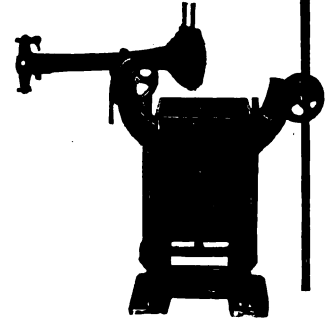
"Moto Nose." The "Moto Nose," or air breather for Ford cars, is a funnel like device which attaches to the neck of the radiator. "Moto Nose" does not tell you when the water in the radiator is too hot, but keeps the water from getting too hot by taking cold air into the radiator over the surface of the water and relieving



the internal air pressure of the radiator. "Moto Nose" is not a fragile instrument. It is made of metal, neatly designed and highly finished. A screen in the funnel opening keeps out dirt and other foreign matter.

Manufactured by the New Era Spring and Specialty Co., Grand Rapids, Mich. Price, black, $1; nickel, $1.50. West of Denver, add 10 per cent.

The "Dixie" Front System and Rear Axle Repair Stand is built for a combination front system and rear axle overhauling stand to take the place of the old fash-

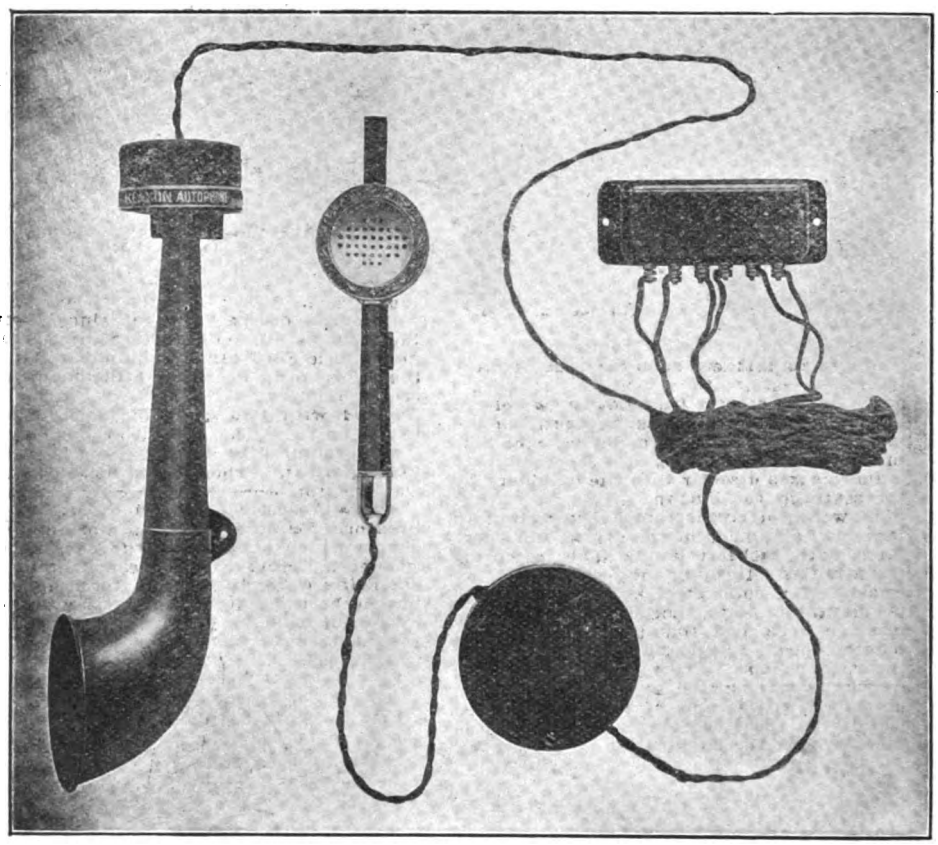


ioned four post or gas pipe type, which is now being used in many garages.

The "Dixie" stand is equipped with two vises, one of them turning on a swivel or pivot and the other tipping sideways. With the aid of these two vises, constructed as they are, various operations can be quickly done from all angles. The stand takes only 1¾ feet of floor space. It can be placed in any location and the service life and utility will continue for years.

Manufactured by the Service Station Equipment Co., Inc., 1201-11 Cortland St., Chicago, Ill. Write for prices.

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The Autophone, the latest addition to the famous line of Klaxon automobile accessories, is a telephone system for communication between the passengers and chauffeur. It is used in both closed and open cars. The voice of the speaker is magnified seven times, and can be heard by the driver in the noisiest streets. The vibration of the car does not in any way interfere with the clearness of the sounds.

The Autophone differs vastly from other instruments used for similar purposes. The occupants of the car can give instructions to the chauffeur without raising the voice or leaning forward from the seat. The transmitter is attached to a cord, which is taken care of by an automatic cord winder when not in use. The Autophone can be used anywhere in the car with equal ease. It is connected with the battery of the car and is always in working order, there being no dry cells used.

The receiver is made in many beautiful and novel designs to harmonize with the interior fittings or upholstery of the car. One design of transmitter is concealed in a hand mirror, another forms part of the decoration of a flower vase, from which it is removed when in use.

The receiver or horn is placed near the driver's head, where he can hear instructions without changing his position or turning his eyes from the traffic. In open cars it is inserted in the dash board or attached to the steering column. This feature of the Autophone is much appreciated from the point of safety.

The entire equipment consists of a tiny receiver, a small transmitter and a few feet of cord. It can readily be connected with the other regular electrical equipment of the car, or with any six or 12-volt storage battery.

Manufactured by the Klaxon Co., Motor Equipment Division, Detroit, Mich. Write for prices and literature.

Shaler Popular Vul-Kit. The sales of this well known tire saver have grown enormously as tire prices have increased. The "Shaler Vul-Kit" is known to the auto owner as the means of doubling tire mileage by sealing casing cuts before dirt and water get in to rot the fabric. Casings always need care that will be given only if the motorist has his own vulcanizer.



The Vul-Kit has a 3½x4 inch curved surface for mending cuts, sandpockets, etc., in all sized casings without removing tire from wheel or letting out the air. A machined surface of 10 square inches mends all tube injuries, curing clear through and making permanent repairs of any size. The asbestos inlaid pressure plate is swiveled to avoid squeezing one side of tube tighter than the other and to enable the largest tube to be handled without pinching its edges. A lamp burning gasoline or alcohol produces the correct heat without dangerous exposed blaze or smoke. A measure gives the proper fuel charge. No watching or regulating is necessary. The fuel is absorbed by a wick so there is no flaming liquid to spill. The handle is detachable for packing to carry in car. Complete with repair rubber, cement and full instructions. Polished nickel. Weight 4½ pounds. One dozen in carton.

Manufactured by C. A. Shaler Co., Waupun, Wis. Price, type G, No. 32, retail price, $3.50.

Oil Soap, one of the Blue Ribbon specialties, is a purely vegetable oil soap of the highest quality. It contains no rancid animal fat or excess alkali. It is an ideal soap for cleaning and washing automobiles, carriages and harness, and a general cleaner for railway trains, boats and buildings.



Manufactured by the International Metal Polish Co., Indianapolis, Ind. Prices: One pound can, 40 cents; two pound can, 65 cents; five pound can, $1.50; 10 pound can, $2.90; 25 pound can, $6.40; 45 pound can, $10.80.

Neatsfoot Clutch and Brake Compound. Slipping clutches or weak brakes take all the pleasure and most of the safety out of motoring. Something must be done at once. When your clutch starts slipping or grabbing, treat the facing with Norwesco Neatsfoot Clutch and Brake Compound. Its efficiency will return promptly. Failing brakes take a new lease of life when



treated with this compound. The linings seize the brake drums with all their old firmness. The compound is not greasy.

Manufactured by the Northwestern Chemical Co., Marietta, O. Price, pint cans, 50 cents.

Hercules All-Year Tops for Ford Cars. The top is covered and the curtains are made of 34-ounce tan back auto rubber. There is a skeleton style top with natural wood bows. The rear side window is stationary and fitted with double strength glass. The curtains above doors roll up, working on a patented roller device and can be raised or lowered instantly. The center metal posts on either side are attached to the Ford top irons and are locked on the inside to the top and can be removed quickly. These poles can be carried under the seat. All irons are adjustable so that a perfect fit can be made on any Ford body of the 1915, 1916, 1917 or 1918 model. It is not necessary to buy a



new windshield, as the Hercules top in connection with the front metal posts is fitted to the old windshield. The net weight of the touring car top is 76 pounds and crated weight 200 pounds. The net weight of the roadster top is 54 pounds and the crated weight 140 pounds.

Manufactured by the Hercules Buggy Co., Evansville, Ind. Write for literature and prices.

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Mormiles is a highly concentrated composition of volatile and essential oils of well known solvent qualities, designed to energize weak, logy, low grade gasoline, making every atom deliver full power to the rear wheels. Mormiles is a modern tablet method for decarbonizing purposes. It is guaranteed to increase present mileage and to keep a motor permanently free from carbon, or money refunded.

Dealers and jobbers are finding Mormiles a fast and profitable seller. A "silent salesman" counter display moves the goods. An unusually attractive proposition is offered.

Mormiles is an all-year motoring aid, insuring easy starting under all weather conditions. It enables throttling down much slower on high, and quickens the



"pick-up." It completely dissolves in the gasoline. Unlike a liquid, it becomes an integral part of the fuel, which passes through the motor of the exhaust. It does not rise to the top or settle on the bottom of the gas tank.

It comes in the convenient tablet form only. It can be carried in the tool box under the seat, so as to be always handy. There are 100 tablets to the box, sufficient to treat 100 gallons of gasoline. One hundred gallons of gasoline, treated with one box of Mormiles, are guaranteed to equal 125 gallons of gasoline in mileage.

Manufactured by Mormiles Co., 226 S. La Salle street, Chicago. Price, 100 tablets, $1. Write for special jobbers' and dealers' proposition.

Peteler Auto Jack. This has a short, easy stroke, and the extension handle permits operation without stooping or reaching under the car. It has an ingenious reversing feature which is a great trouble saver. Its 3000 pounds lifting capacity makes it available for 95 per cent. of the motor driven vehicles in the United States.



The Peteler Jack is designed so it can be used to the limit of its lifting bar with safety. High quality materials are used in its working parts. The finish is attractive and there is a wide, solid base.

Manufactured by the Coe-Stapley Manufacturing Corporation, 135 Broadway, New York City.

Oxigene is a liquid in which pure oxygen gas is held in combination. This liquid is simply mixed with the gasoline in the tank in the proportion of one ounce of Oxigene to each 10 gallons of gasoline. It dissolves instantly. With the gasoline it flows into the carburetor, where it is vaporized. When this mixture of fuel vapor and Oxigene reaches the cylinders pure oxygen gas is liberated on the compression stroke, and when the charge is fired the gasoline vapor is completely consumed. The proportions are so arranged that there is present in the cylinders a little more oxygen gas than is required for burning all the fuel. This excess oxygen combines



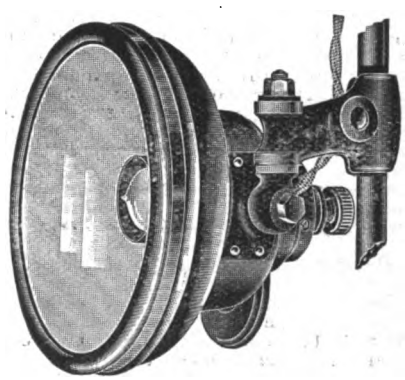
with any deposits of carbon previously existing and removes them completely within a few days. As complete combustion takes place no further carbon can form.

That portion of the gasoline ordinarily wasted as carbon and carbon monoxide is put to work and develops power. Thus for the same power or distance covered less fuel is required. This fact is demonstrated by actually closing the needle valve adjustment of the carburetor so as to cut down the amount of gasoline being used. It is not inflammable or explosive. Each bottle is packed in a strong mailing carton.

Manufactured by Miller Chemicals, Inc., 349-351 West 26th St., New York City. Price, 5 ounce bottle (enough for 50 gallons of gasoline), $1.

Red Spot Searchlight. In addition to the beams of the headlight there often is need of a powerful spotlight for illuminating sign posts and for trouble shooting at night, while if one is to park the car in the evening it is advantageous to have a red light in front as well as in back.

The F. W. Wakefield Brass Co. has brought out a searchlight larger in size and of greater power than the average



spotlight. It is seven inches in diameter and has a 30 candle power lamp. The operator of the car may flash either a white or red beam of light from the lamp by turning a switch, making it serviceable either as a spotlight or danger signal.

Manufactured by the F. W. Wakefield Brass Co., Vermillion, O. Price, $10.

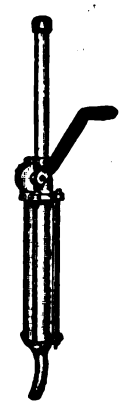
Sterling Cleanable Spark Plug. Many advantages are attached to a spark plug that is easily cleanable, such as the Sterling. Rugged durability is built into the Sterling spark plugs. Petticoat porcelain cores of liberal dimensions and finest material insure perfect insulation. One-



piece nickel alloy electrodes of liberal size guarantee permanent adjustment, long life, freedom from corrosion or disintegration. Perfect fitting copper-asbestos gaskets prevent leakage and allow disassembling time and again without replacement, rendering the plug easily cleanable.

Manufactured by Lockwood-Ash Motor Co., Jackson, Mich. Prices quoted on request.

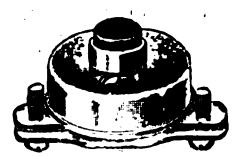
The Boe Repeater Grease Pump is a crank operated geared action pump that dispenses and accurately measures grease or oil by pound or pint, simply by the operator turning a crank. The measuring is governed by a five-inch meter dial



plainly readable through large opening in the cover. It dispenses lubricant about 20 ounces to each pump stroke. The entire cover instantly opens for refilling. It is claimed the measuring will pass state inspection.

H. M. Boe Co., 2416 University Ave., S. E., Minneapolis, Minn. Prices, $25, $40, $50.

Electric Push Buttons. This is made entirely of metal. The finishes are black enamel, black and nickel or black and brass. The upper parts are nickel, brass or black. The clamps are always black

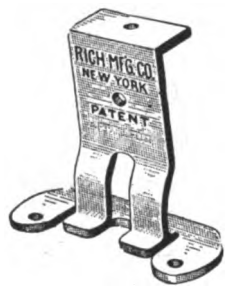


enamel. These push buttons can be used with any make of vibrator or motor horn or for any other purpose where a good metal push button is required.

Manufactured by the Fitzgerald Mfg. Co., Torrington, Conn. Price each, 40 cents; per dozen, each, 36 cents; per 100, each, 30 cents.

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Rico Reinforcement Bracket for Ford Crank Cases. Why wait until the crank case arms snap? "Rico" Brackets prevent vibration, which causes the crank case arms breakage. They are applied as a "safety first" measure before actual break happens, as they stop the vibration, which weakens the engine. They are equally effective, however, after the crank case

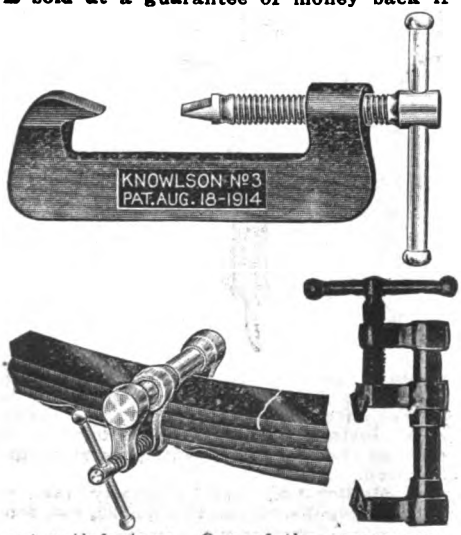


arms have broken. There is no comparison between the cost of "Rico" Brackets and what it would cost to have the engine removed, the crank case taken off and new arms procured and riveted in place of the defective ones.

With "Rico" Brackets there is no necessity for this expense and waste of time. "Rico" Brackets are attached with bolts in a few minutes. The "Rico" Reinforcement Bracket meets the wants of every Ford owner. A broken crank case is a disagreeable experience.

Manufactured by the Rich Manufacturing Co., 1777 Broadway, New York City. Price, per pair, $3.

Knowlson's Spring Leaf Spreader, No. 1, takes the squeak out of autoing and also brings easier riding. Springs go to ruin if neglected and even one jolt of a rusty, squeaky spring may cost many times the price of a preventive. Knowlson's Spring Leaf Spreader is made of drop forgings, nickel plated and polished. The spreader is sold at a guarantee of money back if



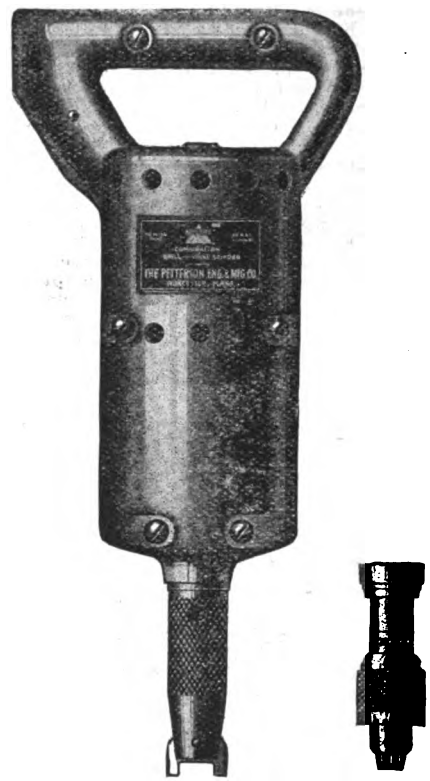
not satisfactory. One of the accompanying illustrations shows the device as a temporary spring clamp.

Knowlson's Spring Spreader No. 3 is a strong, durable tool, drop forged and polished, and with a gun metal finish, with screw and handle of dull nickel plate. It has all the qualities of the higher grade Knowlson Spring Spreader except the clamping of a broken spring.

Manufactured by the Spring Leaf Lubricator Co., Ann Arbor, Mich. Prices: No. 1, $1.75; No. 3, $1.25.

Bilt-Rite Combination Drill and Valve Grinder. Is an electric portable device for valve grinding or drilling holes up to ¼ inch in diameter. With a screw driver change fom one operation to the other is made in a few moments, giving an oscillating motion for valve grinding and the required speedy rotary motion for drilling, neither operation interfering with the other.

The oscillating speed is not excessive,



engineering calculations on successful grinding determine speed as indispensable. The finer the compound used the smoother the seat. The drilling or valve grinding action may be had separately, the mechanical conditions remaining the same.

Innumerable times in auto repair shops or manufacturing plants a light portable drill for small miscellaneous drilling saves time. A Bilt-Rite Electric Valve Grinder energizes a particularly slow, tedious job, by doing it electrically, and cuts down labor costs.

Specifications for the combination drill and grinder are as follows: Socket plug, eight-foot cord, attachment plug, cut-out switch between slip plug and motor, 1-12 horsepower motor for 110 to 130 direct current or alternating current or universal, grinder chuck, drill chuck, three drivers to fit grinder chuck for all cars except Buicks and Franklin. Special chucks for Buicks and Franklin cars $1 additional.

Heat treated steel gears with steel shaft and bronze bearings. Motor pinion forced on and keyed to the motor shaft. Specify higher voltage if desired. Same specifications apply on electric drill and valve grinder separately omitting grinder chuck and drill chuck respectively. One valve spring of a tension sufficient to allow a wide margin of safety in grinding valves as far as pressure is concerned is furnished.

Manufactured by Patterson Engineering and Manufacturing Co, Worcester, Mass. Write for literature and prices.

Rives' Neverslip Auto Pedal Pads. These give safety and protection to every occupant of the car. Did you ever stop to think when the driver of a car has to push out the clutch and push on the brake to avoid an accident, what the result might be or what it might cost if his foot slipped? The Rives Neverslip Pads are

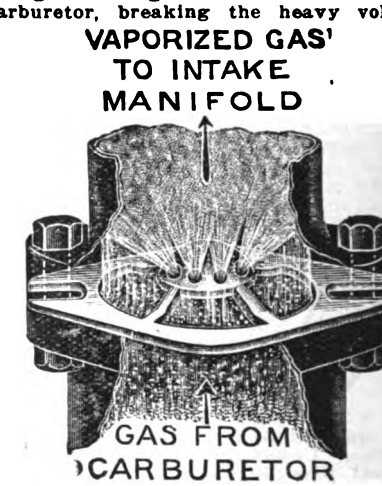


adhesive and resilient. They kill vibration and are a non-conductor of heat. As a protection from rough metal they prevent wear and tear on shoes.

They may be attached in a few minutes by simply bending the metal clamps around the back of the pedals. They are made of live white rubber. The rubber is vulcanized through and locked securely to the metal. There is a patent attachment. A design is made for every car.

Manufactured by George H. Rives Manufacturing Co., Inc., 2187 Woolworth building, New York City. Prices: All designs and numbers, $1 per set, except Ford Specials, which are 50c a set of three pads.

Conservo Vaporizer. Is a device that can be installed in a few minutes, between the carburetor and the intake manifold. It is claimed that Conservo effects a change in the gas as it comes from the carburetor, breaking the heavy volume



PATENT PENDING

into a vapor, actually forcing every drop of gasoline to be used to its full efficiency and giving the one perfect scientific mixture for the cylinders, and that the power of the motor is increased.

Conservo is sold under a money-back guarantee. It is claimed that carbon is practically eliminated, due to the fact that the gasoline is thoroughly vaporized and thus more complete combustion is obtained.

Conservo Sales Co., Inc., 225 Fifth Ave., New York City. Price, $5.

Waxit is both a cleaner and polish. Its function is first to take off the dirt, grease and dust and restore the brilliancy to



finish which it formerly possessed. Both of these results are accomplished in the same operation. No oily film or waxed surface is produced. The original luster is brought back. Waxit is sold in six ounces, 14 ounces and quart bottles and half gallon and gallon cans. The price range is from 35 cents to $3.50.

Manufactured by Waxit Manufacturing Co., Old Colony building, Chicago, Ill. Write for attractive dealers' proposition.

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REPAIRS OF AUTOMOBILE TIRES

Great Strides Are Made In Methods of Working on Both Fabric and Cord Casings and Modern Operations Give Insurance of Dependable Results

WITHIN the past few years great strides have been made in the methods of tire repairing in both fabric and cord casings. The development has passed from the makeshift, temporary repairs to scientific and highly dependable operations, requiring considerable skill.

Throughout the country many shops are devoted entirely to the repair of both solid and pneumatic tires, and these are often of considerable size, employing workmen who are specially trained. Practically all the factories operate repair departments, some of which are large size.

There are many methods for work and widely varying equipments and materials, so that fixed rules for repair work cannot be laid down and followed.

Punctures are, perhaps, the greatest cause of damage, and the most frequent occasion for repair. In many instances these are not serious at the cutset, but must be given immediate attention. Moisture and sand will work into the cuts and reach the vital layers of fabric and will cause disintegration of both these and the tread rubber. Serious results eventually follow. The fabric may break from internal pressure, finally blowing out and necessitating extensive and expensive repairs, or perhaps ruining the shoes.

It is highly important to repair punctures promptly by filling them, or to reinforce the fabric. If the cut is through the plies of fabric repair can be made on the inside of the tire by removing one or two thicknesses of fabric, depending, of course, on the size of the rupture. The repairs will be more permanent if vulcanized.

Should one desire to make emergency repair to a punctured casing for temporary use in the event of small blowouts, procure a strong, durable inside patch and an outside boot from any repair shop, or, better still, carry them in the car always.

Small cuts are unavoidable and if neglected, foreign matter will enter them and reach the breaker strip and unless repaired the fabric body or carcass, resulting in the fabric separating from the rubber. The fabric will be rotted by exposure to water.

For temporary protection rubber filler may be pressed into small cuts and punctures. After being exposed to the air this compounded rubber hardens without heat.

Damage of this nature may be permanently repaired by buffing the several cuts with the use of a rasping file. A coat of vulcanizing cement is put on and allowed to dry for one hour, after which a second coat is applied. Fill in with tread gum and trim the edges of the new gum so that the repair will be smooth and even with the old rubber surrounding it.

Though various methods are used in repairing blowouts, one commonly employed is by stepping down the old fabric on the inside around the rupture. This is the inside method. The number of plies to be removed will, of course, depend on the size of the tire. For instance, remove two plies from 3½ and a four-inch tire, remove three plies from a 4½-inch and four plies from a five-inch tire.

This done, apply a coat of vulcanizing cement and permit this to dry for one hour or more. A second coat is applied, and when it reaches the "tacky" stage, determined by the touch, fill in the depression with one or two plies of gum, after which place the new fabric to replace that removed.

Care should be taken that the patch consists of the same number of plies as removed, and its stepped-up plies should correspond with the stepped-down plies of the old fabric. The extra last ply of the fabric overall should be bareback or unfrictioned on one side, and should extend at least three or four inches beyond both ends of the patch underneath, giving the material much better adhesion and reinforcement.

The removal of any of the old rubber on the outside of the casing is not necessary, nor is it necessary to apply new material except filling in a puncture or other small cuts with new gum. It will be seen that less material is required with this process, and this is the best feature of the method. For small breaks and blowouts it is effective, indeed, but for very large blow-



Putting on the Rubber—The Process That is Known as Building Up.



Repairing Auto Tires—Putting on a New Piece of Fabric.

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Repairing Auto Tires—Showing the Result of a Blowout.



Building Up Tire for the Mold.



After Tire Is Built It Is Trimmed—Better Known as Skiving—Before It Is Put in the Mold.

outs one should use a combination of the inside and outside methods.

Inside and Outside Methods.

It is a very common error for the repair man to remove the rubber only part way down the casing side walls. Where this is done the wall is weak at the juncture of the old and new, and there is not the strength that would have been obtained had more of the rubber been taken off. At such a point of weakness the bend may be so sharp that the fabric will soon break.

In making such repair the following plies are removed:

For 3-inch tires remove two plies.

For 3½-inch tires remove two plies.

For 4-inch tires remove two or three plies according to the damage.

For 4½, 5 and 5½-inch tires remove three or four plies according to the need.

The rubber side wall should be removed down over the beads. When the new fabric is applied it will have a better foundation and the repair will not be clumsy or irregular, and this results in a better fit to the rim, which is quite essential if the tire is the clincher type.

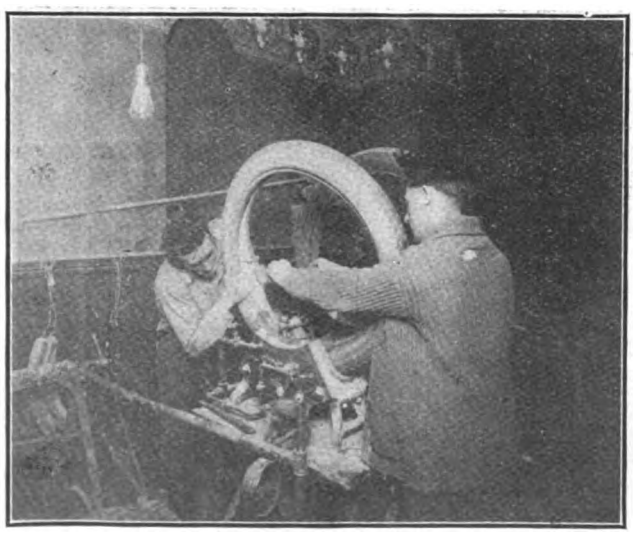
Repairs for Blowouts—To Build Up.

One coat of vulcanizing cement is applied and allowed one hour to become dry, after which the second is put on and allowed to dry for the same length of time. It is of the highest importance that all cement be given plenty of time to become dry on all repairs; otherwise the repairs will blow or loosen during the process of vulcanizing.

Apply the same number of new plies of building fabric, which is frictioned on both sides and coated one side, that were removed from the tire and then apply the chafing strip or light weight fabric over the beads. Over the building fabric apply a thin sheet of cushion gum (approximately 1/32 inch) of a width slightly more than the width of the breaker strip.

Over the cushion gum apply one thickness of fabric breaker strip, frictioned on two sides, coated on two sides.

This done, over the fabric breaker strip apply another sheet of cushion gum slightly narrower than the sheet of the cushion gum underneath the fabric breaker strip and approximately ¼ to the ½-inch wider on each side than the fabric breaker strip.

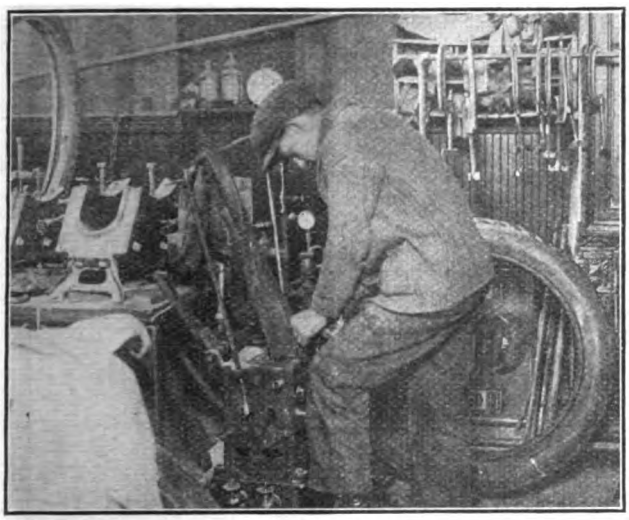


Clamping Tire in the Mold to Make the Repair Smooth.

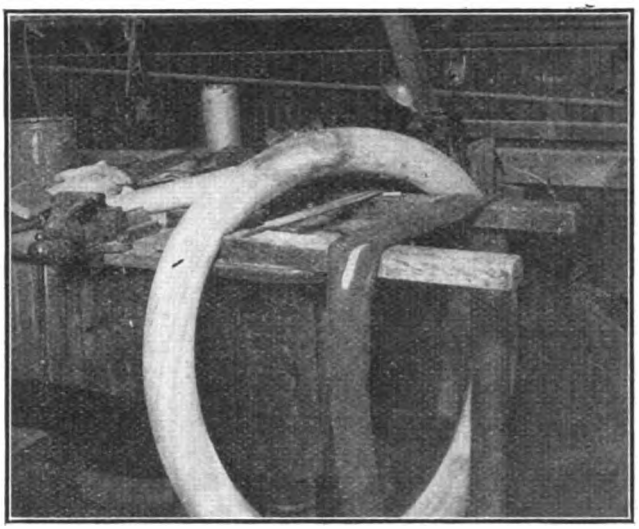


Repairing a Bad Spot in a Tire Tube.

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Vulcanizing a Tube.



Before and After Repairing.

It has been the custom with some repair men to build up a tread section on the case, one ply or thickness at a time. This method has been satisfactory, for the reason that there is danger of air pocket formations. Also, it requires more time and the workmanship is less practical. This method is not to be recommended if any degree of success is desired.

The several plies of tread gum 1/16-inch should first be rolled together on the work table, then applied to the tire.

It must be borne in mind that the width of plies and thickness of tread section must be determined by the wear and condition of the old tread of the case.

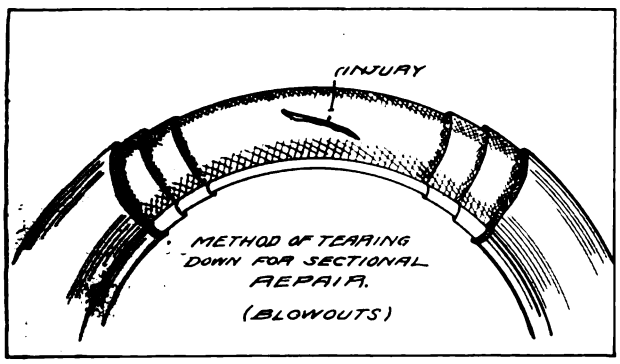
Considerable care is used in the beveling of the old rubber to the edges of the repair; also in the way in which the new rubber laps over. The object sought is to secure good pressure during vulcanizing, and to insure better adhesion between the old and new stocks than when the edges of the repair are straight butted. To overcome this one should carefully trim the new gum at the edges of the repair so that it tapers down neatly with the surrounding surface of the old rubber.

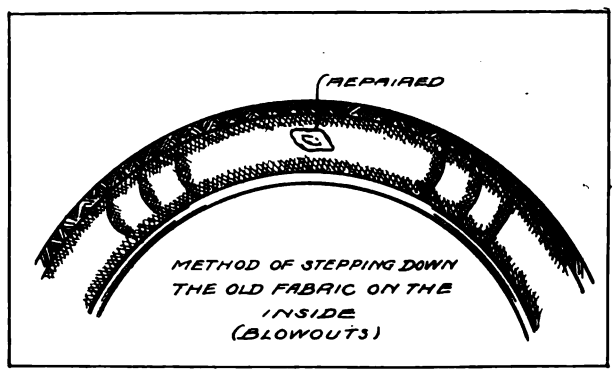
In case this is not done the new gum will flow somewhat over the edges of the old rubber and may work loose after the tire is put in service. With this repair it is not necessary to remove any of the fabric from inside the case.

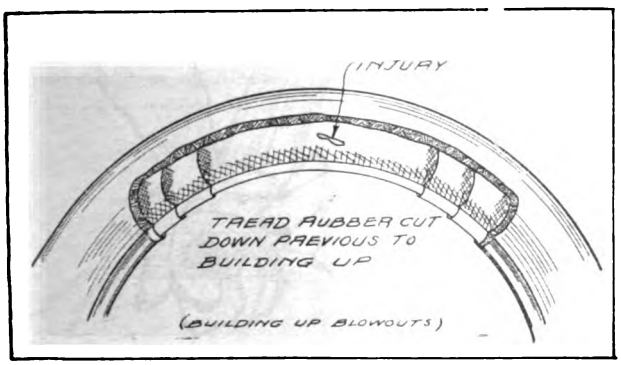
When the outside has been built up, fill the hole of the old fabric from inside with tread gum. Finally the inside of case is reinforced with a small patch of building fabric. Place this over the gum filler and over this place two plies of building fabric.

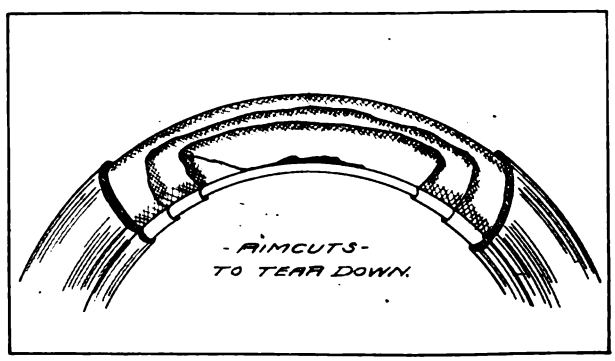
Rim Cuts. To Tear Down.

To repair rim cuts, ordinarily two plies of fabric are removed, except when the rim cut extends for a considerable distance around the tire's circumference, in which event three plies are removed, all sizes inclusive. In building up apply the vulcanizing cement and new material as previously outlined in the rebuilding of blowouts, except that a breaker strip is not necessary

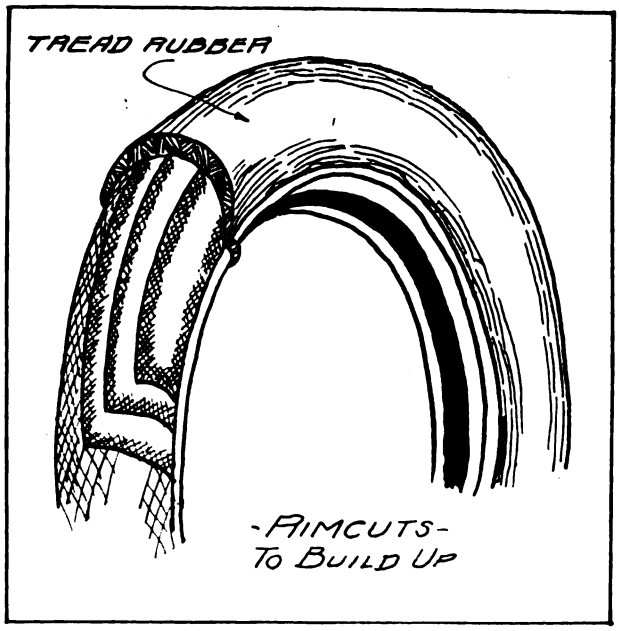


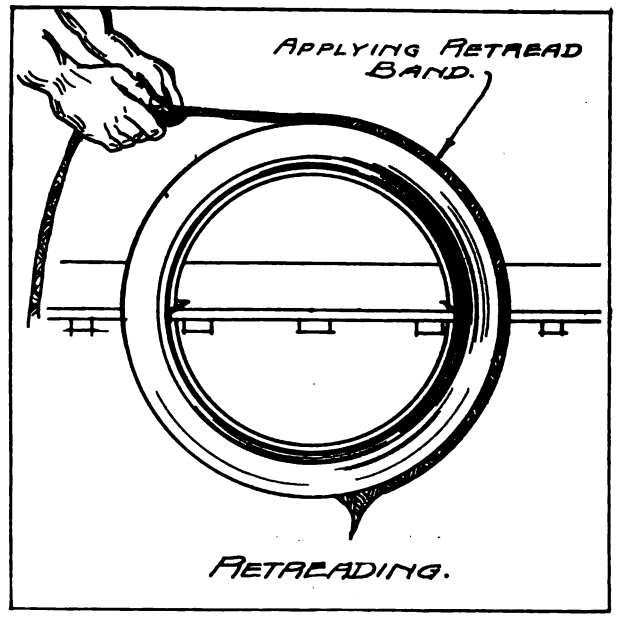






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with this method of repair. The building fabric not only extends down the bead to the toe, but up on the inside of the case far enough to secure sufficient anchorage.

Should the tire be rim cut all around it will be necessary to remove the old side wall rubber up to the edge of the tread.

For this work remove old chafing strip and one ply of old fabric about one inch above the tire beads. Cut through the side wall rubber all around and use great caution not to cut into the fabric of the body. The sidewall rubber and chafing strips can be removed in one operation.

In building up apply two coats of vulcanizing cement and when thoroughly dry put on one ply of building fabric and over this one ply of chafing fabric which is frictioned on two sides.

Over the chafing fabric apply new tread gum to the side walls. Do not apply one thickness at a time to the case, but roll this gum together on the work table. The thickness is determined by the size of the old case. Vulcanize in sectional molds with sectional air bags and bead molds or, if desired, use a sectional air bag, apply to curing rim, wrap and vulcanize in heater.

In retreading a tire there are many conditions to be taken into consideration. Among them are the quantity of materials that are required and the financial outlay attached to the work. The rubber on the side walls above the beads must be in good condition, not chafed, rut worn or disintegrating from the effects of oil or grease or hardened or cracked from sun or age. Considering the fabric of the case, this must be solid and not in any way separated between the plies; otherwise one cannot hope to be successful in vulcanizing.

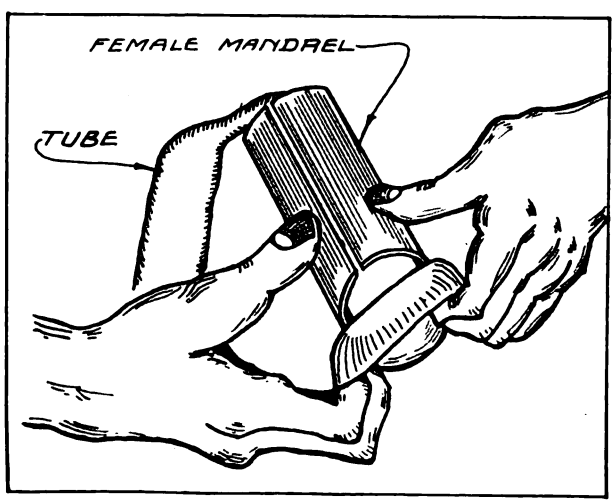
Tearing Down.

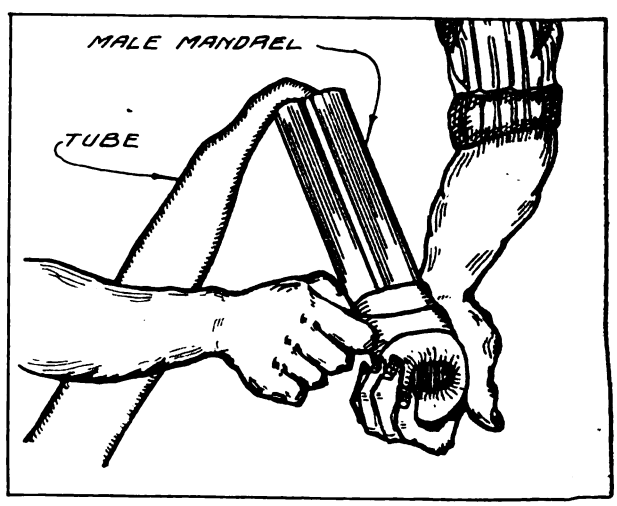
If the rubber is removed only to the fabric breaker strip and the new gum applied over it, much trouble is likely to be experienced from materials becoming loose afterwards as a result of moisture or dirt that may have previously worked under the fabric breaker strip through small cuts. It is, however, advisable in most instances that the old tread rubber be removed, also the fabric breaker strip and the cushion rubber underneath. This will reveal the condition of the fabric or body of the case and any small breaks that require patching may be patched at this time.

If the old tread rubber is cut up badly with very small cuts, yet deep, and cannot be torn off, an effective means in their removal is to use a machine equipped with a rotary rasp file for this work.

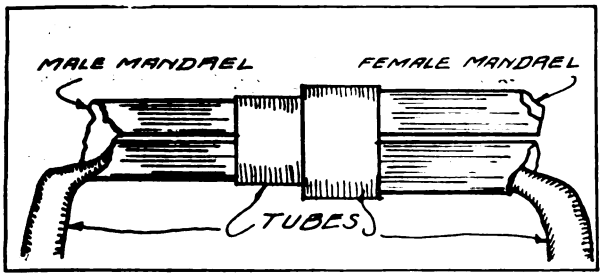
When using this machine be careful that the file does not injure the fabric or case by gouging into them. It is much better, if possible, to use a rotary wire brush in the removal of small particles of cushion rubber from the fabric.

It is very important that all old rubber and foreign matter be removed from the fabric body under the part to be rebuilt. It is common practise after buffing to





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clean the fabric with muslin dipped in gasoline. This treatment is not recommended, nor is it necessary, for the reason that the fabric of an old tire will absorb a good percentage of the gasoline and it is practically impossible to dry it afterward. If any of the fluid remains in the fabric a gas will form during vulcanization, resulting in the new stocks loosening, and the cure will be delayed.

After buffing, one should remove all particles of loose rubber from the fabric by the use of a whisk broom or piece of muslin.

In the building process, apply two coats of vulcanizing cement. Care should be taken to have the first coat very light so that it will readily be absorbed into the fabric, and the second coat put on heavily so it will form a body.

It is not necessary to rebuild as thick as was the original tread and it is not advisable, as it requires a long cure to vulcanize, and weight is detrimental to the carcass of an old casing that has seen long service.

The casing could hardly be expected to render enough more mileage to wear out a second tread as thick as the original, although this frequently happens. The table herewith shows the number of plies of gum to be used for each size of case, together with the thickness and width of fabric breaker strip.

Specify, when ordering cushion gum, the thickness—1/32-inch. Then apply one at a time, one underneath and one thick above the fabric breaker strip, extending from ¼ to ½ inch on each side of the breaker strip.

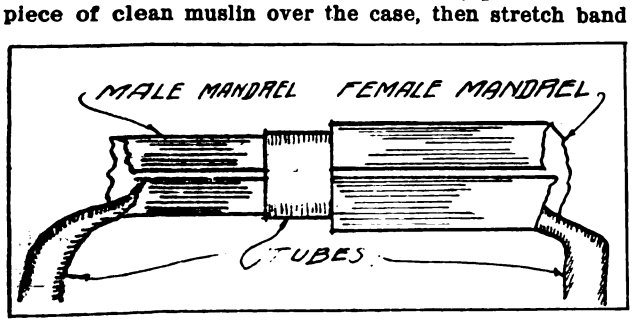
Breaker: This fabric breaker should be cut straight with the threads and not on the bias, and of such length to permit a ¼ inch lap at ends.

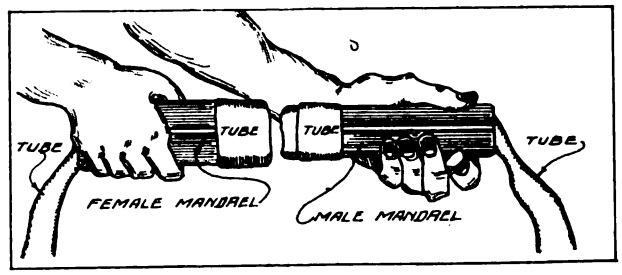
Tread: When this stock is ordered specify the thickness to be 1/16 inch. The tread is built up flat on a table entirely free from the slightest irregularity. The width of the overall ply should always be determined by the condition of the case after buffing and cementing.

In putting on the tread bands the case is prepared by removing all old tread rubber, buffing and cementing in the same manner as for plain retreading.

The inside surface of the non-skid retread band should be buffed to present a rough surfact, so the cement case will adhere firmly. A light coat of vulcanizing is now applied, and when dry a heavy coat is then put on.

In order to insure a good union between the tread surface and the band the cemented surface should be given an application of cushion gum. When the cemented case is thoroughly dry and cushion gum has been applied to a non-skid tread band, place a wide piece of clean muslin over the case, then stretch band





into position, after which center it on case. The muslin is now removed and the band rolled tightly down to the case all around..

To prevent the non-skid surface being crushed under wrapped pressure during vulcanization, prepare a thick mortar and water and fill in around the sharp angles, or whatever the surface happens to be.

Place a wet muslin jacket over the case, cross, wrap around twice, then vulcanize in the same manner and for the same length of time as any plain tread casing.

Relining.

It quite frequently happens that cases are found to be in good condition on the outside, but unfit for much service on account of internal fabric breaks. However, if these breaks are small, an application of a ply of building fabric will in many instances be sufficient for the necessary reinforcement, and in so doing one is able to secure more mileage. Before the new fabric is put on one should remove the soapstone, white paint and other foreign matter from the old fabric with a wire brush and afterwards apply two coats of vulcanizer cement.

If the fabric is found to be broken all around, it is advisable to reline the case with two plies of building fabric (stepped, of course,), the under ply being frictioned on two sides and one side coated. The upper ply is frictioned one side only, the side toward the tube being bareback.

However, it is the practise of some repair men to turn the inside of the case out in applying a reliner. Under these conditions the reliner will, after the case has resumed its normal shape, buckle and become very rough.

Use an endless air bag for internal pressure, apply to a split rim, wrap and vulcanize in the heater from 45 to 50 minutes at 40 pounds steam pressure. If one prefers the use of a wire coil for an internal form, a fabric pad should be placed around the coil to prevent marks or impressions in the reliner. In using this coil it is not necessary to split the curing rim.

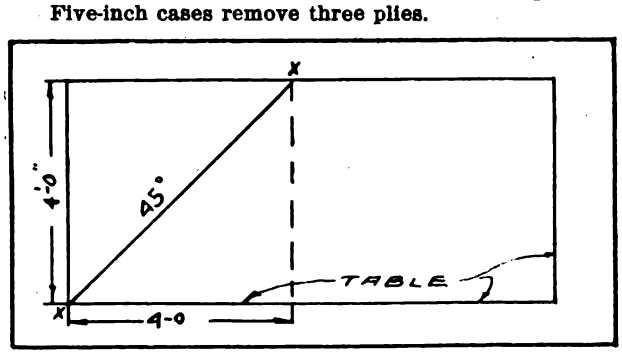
The same method may be followed in tearing down and building up fabric cases can be followed in the repair of cord tires.

For sectional work on:

Four-inch cases remove two plies of fabric.

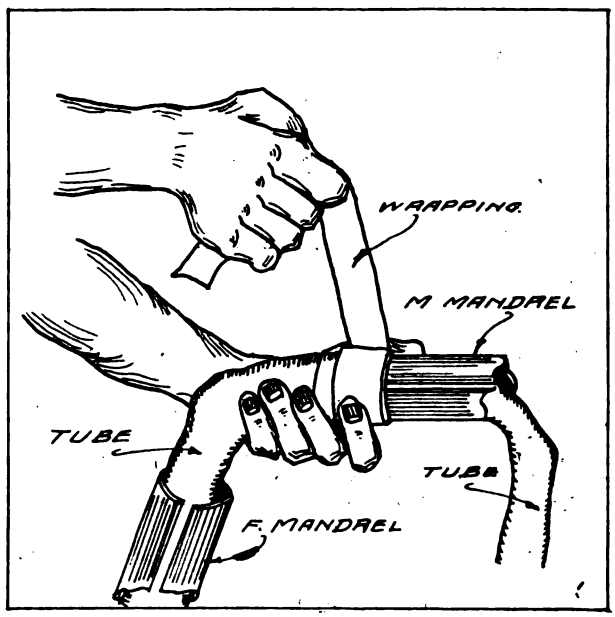
Four and one-half-inch cases remove three plies.

Five-inch cases remove three plies.



Fabrics Should Be Cut on Bias, Same as When Manufactured. Illustration Shows Table on Which This May Be Done, Establishing Two Points Marked X Equal Distance from Corner, Giving 45 Degree Line.

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Five and one-half-inch cases remove four plies.

The steps in the cord tire layers are made so that each new layer of cord will have from one to 1½-inch lap on larger sizes.

The same cement is used as on regular fabric cases and allowed to dry in the usual way.

One may build up sectional repairs with the regular fabric, but these repairs would be quite stiff and unyielding and not so elastic as other parts of the tire. Further than that, there is some danger of the repair bumping, causing vibration to the car. The cord tire was beyond the ability of the average repair man until recently. In applying the layers care must be taken to have the cords run parallel with the cords of the layer removed, butting the new material up tight against the old material. Therefore, it is advisable to apply a thin narrow strip of cushion gum over the joints.

The same breaker strip fabric and the same chafing strip fabric are used as in fabric casing repair. The tread is built up in the usual way.

In the use of sectional air bags, observe carefully that they fill out the case properly, also that the beads make good fit. This is highly important that there is uniform pressure on every part of the sectional repair during vulcanization. If the sectional air bag intended for the case does not fit as well as it should a larger air bag should be used if possible, or pads of one, two, three or four thicknesses of fabric may make a sufficient change.

In inflation of tire bags it is essential that some reliable means be used to maintain uniform pressure, such as is possible with a reliable pressure gauge, and the length of service may be increased 20 to 25 per cent.

In order to prevent variation in the cure of the gum on two different sectional repairs, though vulcanizing at the same steam pressure and other conditions are equal, it is imperative to have some definite air pressure. If this is not obtained the rubber on the two will be effected differently, due to the greater or lesser degree of consolidation in the vulcanizer.

Naturally after some service these bags become fairly brittle from exposure to heat and then a higher pressure than should be used causes breaks in the fabric. Therefore, adopt a uniform air pressure and cling to it if possible—50 pounds is recommended. It is understood that no two cases, even of the same size, and style, are exactly of the same shape, after being in use for some time. This does not in any way interfere with the fixed air pressure.

To take care of any variations, fabric pads of one, two, three or four plies in thickness may be used. To inflate the air bag to an excessive pressure to fill out the case will bring about stresses that will eventually shorten its length of normal use.

Repairing Inner Tubes.

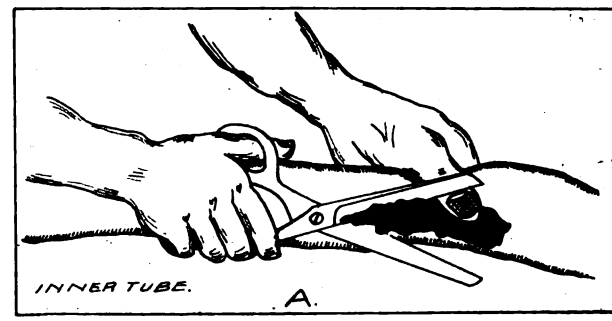
Inner tubes that have been cut, punctured or otherwise damaged are usually repaired by placing a small rubber patch over the rupture and coating the surfaces with cement and acid curing mixture, known as the cold process. This will serve very well in an emergency, but to be dependable one should vulcanize it later.

To vulcanize the patch first trim the edges of the cut in the rubber with scissors and then make an opening of sufficient size to permit the insertion of an inside patch. Of course the length and width of the opening will depend on the extent of the rupture.

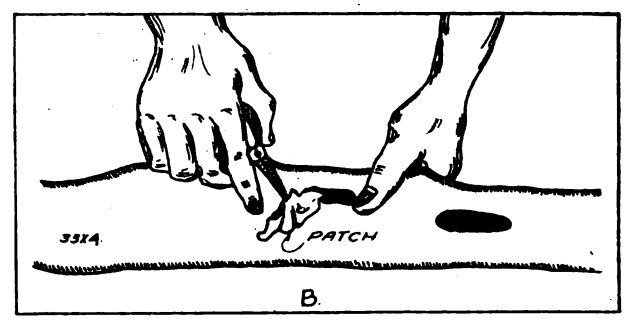
All sulphur should be thoroughly removed from the rubber by using a piece of muslin dipped in gas or benzine. Apply one or two coats of vulcanizing cement to the portion cleaned and allow it to dry thoroughly.

The inside patch should be approximately ½ to ¾-inch larger all around than the hole or cut and the sticky or the uncured side placed toward the hole. The reverse side is semi-curled to prevent adhesion to the opposite side of the tube.

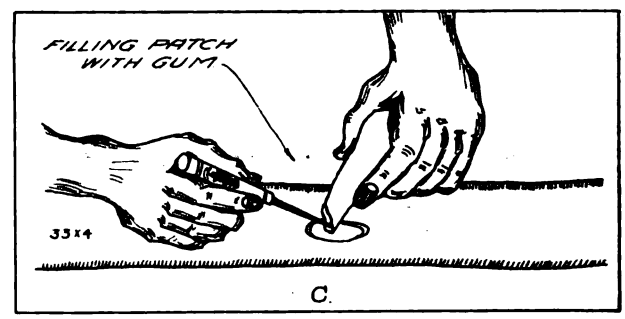
For filling the opening, flush with the rubber around



Trimming Ragged Edges with Scissors.



Inserting Inside Patch.



Filling Cavity Over Inside Patch with Gum Until Flush with Rubber Around Repair.

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PARTIAL LIST OF EXHIBITORS

BOSTON AUTOMOBILE SHOW
MARCH 15 TO 22, 1919

Space No.	Name	Address
711	Acme Die Casting Corporation	176 Federal St., Boston, Mass.
426	Allen Cars	685 Beacon St., Boston
559	American Chain Co., Inc	Bridgeport, Conn.
553-554	American Motor Equipment Co	181 Massachusetts Ave., Boston
611-BB	American Mutual Liability Insurance Co	245 State St., Boston
727	American Retreading Corporation, The	135 Everett Ave., Chelsea, Mass.
515-AA	American Technical Society	252 Summer St., Boston
38-AA	American Tool and Cotton Reporter	530 Atlantic Ave., Boston
38	Anderson Cars	Motor Mart, Boston, Mass.
138	Anthony, F. P	80 Brookline Ave., Boston
115	Apperson Motor Car Co. of N. E	727 Boylston St., Boston
413-414	Arrow Grip Manufacturing Co., Inc	Glens Falls, N. Y.
147	Atlantic Auto Co	1107 Commonwealth Ave., Boston
443	Atwater Kent Sales Co. of N. E	883 Boylston St., Boston
134-135	Auburn Car	Ball Sq., West Somerville
718	Auto Indicator Co	209 Ottawa Ave., Grand Rapids, Mich.
605AA	Automatic Air Cushion Co	17 Chardon St., Boston
516	Automobile Dealer and Repairer	71 Murray St., New York
447-AA	Automobile Journal	Pawtucket, R. I.
602	Automobile Legal Association	6 Beacon St., Boston
603	Automobile Mutual Liability Ins. Co	40 Central St., Boston
617	Automobile Snow Attachment Co	West Ossipee, N. H.
408	Automobilists Co-Operative	40 Court St., Boston
551	Apco Manufacturing Co	Providence, R. I.
425A	American Bosch Magneto Co	Springfield, Mass.
619	Barnstead Still and Sterilizer Co	7 Lanesville Terrace, Forest Hills
609-AA	Bay State Auto Association	Boston
14-18	Beacon Motor Car Co	660 Beacon St., Boston
22-23	Becker-Stutz Auto Co	677 Beacon St., Boston
427	Biddle Car	71 Amherst St., Cambridge
557	Bigelow & Dowse Co	229 Franklin St., Boston
622-623	Black & Decker Co	109 S. Calvert St., Baltimore, Md.
526-527	Boice Motor Equipment Co	76 Brookline Ave., Boston, Mass.
704	Boston Blacking Co	Third and Potter Sts., Cambridge, Mass.
134-BB	Boston Herald, Bureau Department of Reports	Boston
146	Boston Oldsmobile Co	940 Commonwealth Ave., Boston
5-9	Bowman Co., The J. W	91 Massachusetts Ave., Boston
137	Briscoe Car	80 Brookline Ave., Boston
444	Bristol Manufacturing Co	271 Franklin St., Boston
531-532	Brooks-Skinner Co., Inc	Quincy Point, Mass.
32	Brown, Frank L	907 Boylston St., Boston
140-144 Inc.	Buick Boston Co	97 Massachusetts Ave., Boston
612	Bulldog Luggage Guard Co	39 Elm St., Nashua, N. H.
600	Burton-Rogers Co	899 Boylston St., Boston
550	Butts & Ordway Co	33 Purchase St., Boston
2	Cadillac Automobile Co. of Boston	664 Commonwealth Ave., Boston
3	Caldwell, Frederick J., Inc	1043 Commonwealth Ave., Boston
540	Caldwell, John	280 Columbus Ave., Boston
727	Cambria Tire Exchange	204 Columbus Ave., Boston, Mass.
511	Campbell Co., A. S	276 Commercial St., Boston, Mass.
613	Camden Anchor Rockland Machine Co	Camden, Maine
700	Carroll Manufacturing Co	685 Massachusetts Ave., Arlington, Mass.
544	Campbell Motors Corporation	Boston, Mass
24-25	Canterbury, Inc., George W	757 Boylston St., Boston
614	Caplan Bros	77 Bedford St., Boston
436	Central Automobile Tire Co	113 Staniford St., Boston
117-118-132	Chalmers Car	620 Commonwealth Ave., Boston
434	Champion Ignition Co	Flint, Mich.
416	Champion Spark Plug Co	Toledo, Ohio
122A-123-124	Chandler Motors of N. E., Inc	714 Beacon St., Boston
428	Chase & Co., L. C	89 Franklin St., Boston
610	Cherry, A. L., Inc	903-905 Boylston St., Boston
116-133	Chevrolet Motor Co. of N. E., Inc	27 Huntington Ave., Boston

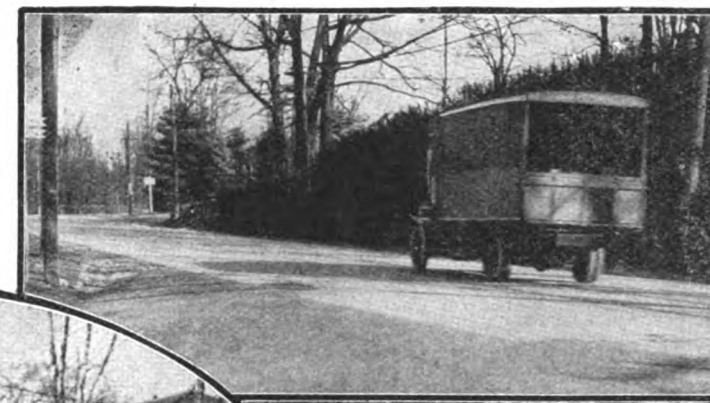
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Space No.	Name	Address
3-AA	Chilton Co.	Market and 49th Sts., Philadelphia, Pa.
134AA	Class Journal Co.	239 West 39th St., New York
439	Cochran Pipe Wrench Mfg. Co.	78th and Woodland Ave., Chicago, Ill.
713	Coe-Stapley Manufacturing Corp.	136 Liberty St., New York
36-37	Cole "8" Car.	661 Beacon St., Boston
438	Collins & Co., Inc., George	215 Columbus Ave., Boston
606	Columbia Tire and Top Co.	922 Commonwealth Ave., Brookline
542-543	Connell Co., W. J.	171 Massachusetts Ave., Boston
129-130-131	Connell & McKone Co.	533 Commonwealth Ave., Boston
544	Continental Motors	Boston
500-501	Coward Auto Supply Co.	222 Eliot St., Boston
562-563	Craig-Wyman Co., Inc.	93 Massachusetts Ave., Boston
24-25	Crane-Simplex Cars	757 Boylston St., Boston, Mass.
415	Crew-Levick Co.	Second and Monroe Sts., Cambridge, Mass.
4	Cunningham, Son & Co., James	1117 Commonwealth Ave., Boston
625	Dace Auto Wheel Equipment Co.	1188 Main St., Bridgeport, Conn.
5-9	Daniels "8"	91 Massachusetts Ave., Boston
426	Davis Car	685 Beacon St., Boston
410	Davis Chemical Manufacturing Co., Inc.	306 Warren Ave., Brockton, Mass.
616	Davis-Lynn Storage Battery Manufacturing Co.	486 Chestnut St., Lynn, Mass.
627	Davis-Watson Manufacturing Co.	62 Baltimore St., Lynn, Mass.
724	Double-Seal Ring Co.	39 Elgin St., West Roxbury, Mass.
411-412	DeLano Co., The	288 Columbus Ave., Boston
400	Derf Manufacturing Co.	90 West Broadway, New York
104	Detroit Electric	530 Commonwealth Ave., Boston
435	Detroit Pressed Steel	1800 Mt. Elliott Ave., Detroit, Mich.
523-524-525	Dixon Crucible Co., Joseph	49 Federal St., Boston
108-109	Dodge Bros. Car	1079 Commonwealth Ave., Boston
111-112	Donovan Motor Car Co.	626-657 Commonwealth Ave., Boston
30-31	Dort Cars	793 Boylston St., Boston
148-149	Dunbar, Sanders, Bowen, Inc.	655-657 Beacon St., Boston
134-135	Dutton Motor Co., F. A.	Ball Sq., Somerville, Mass.
445-446	Dyer Co., The G. H.	155 Brookline St., Cambridge
139-145	Elcar	650 Beacon St., Boston
547	Electric Storage Battery Co., The	718-720 Beacon St., Boston
448-449	Elgin Car	1039 Commonwealth Ave., Boston
125-126-127A	Essex Car	652 Beacon St., Boston
518	Esta Co.	107 Massachusetts Ave., Boston
402-403	Farley & MacNeill	105-107 Federal St., Boston
33-AA	Farm Implement News—The Tractor and Truck Review	5 Park Sq., Boston
117-118-132	Fay-Allen Co., C. E.	620 Commonwealth Ave., Boston
113-114	Fiat Motor Sales Co. of N. E.	839 Boylston St., Boston
723	Fire Gun Manufacturing Co.	48 Summer St., Boston, Mass.
512	Flentje, Ernst	1643 Cambridge St., Cambridge
100-101	Ford Motor Co.	96 Brookline Ave., Boston
406	Franklin, M.	28 School St., Boston
7-11	Franklin Motor Car Co.	722 Beacon St., Boston
29	Falk-Baker Co.	893-895 Boylston St., Boston
703	Gastine Co.	Bridgeton, N. J.
626	Gates Rubber Co.	Denver, Col.
412	General Appliance Co., The	Boston, Mass.
150-151	Grant Motor Sales Co.	715 Beacon St., Boston
545-546	Gray & Davis, Inc.	Boston, Mass.
611	Greb Co., Inc., The	172-173 State St., Boston
707	Green Co., Jos. E.	238 Purchase St., Boston, Mass.
560-561	Green & Swett Co.	821 Boylston St., Boston
427	Guertin DeRochemont Co.	749 Boylston St., Boston
705	Griest Mfg. Co., The	New Haven, Conn.
710	Guaranty Motors Co.	868 Main St., Cambridge, Mass.
555	H & H Motor Specialties, Inc.	755 Boylston St., Boston
Hupmobile, Hall	Hall Motor Co.	574 Commonwealth Ave., Boston
424	Harley Davidson Motorcycles	163 Massachusetts Ave., Boston
401	Harnett Lubricating Co.	100 Boylston St., Boston
26-27-28	Hart Co., A. T.	661 Beacon St., Boston
405	Hart & Hutchinson Co., The	141 Milk St., Boston
507-508	Hartford, Inc., Edward V.	319 Columbus Ave., Boston
517	Hartley-Bishop Co.	243 Columbus Ave., Boston
624	Hastings & Co., A. W.	134 Friend St., Boston
38	Haynes Cars	Motor Mart, Park Sq., Boston

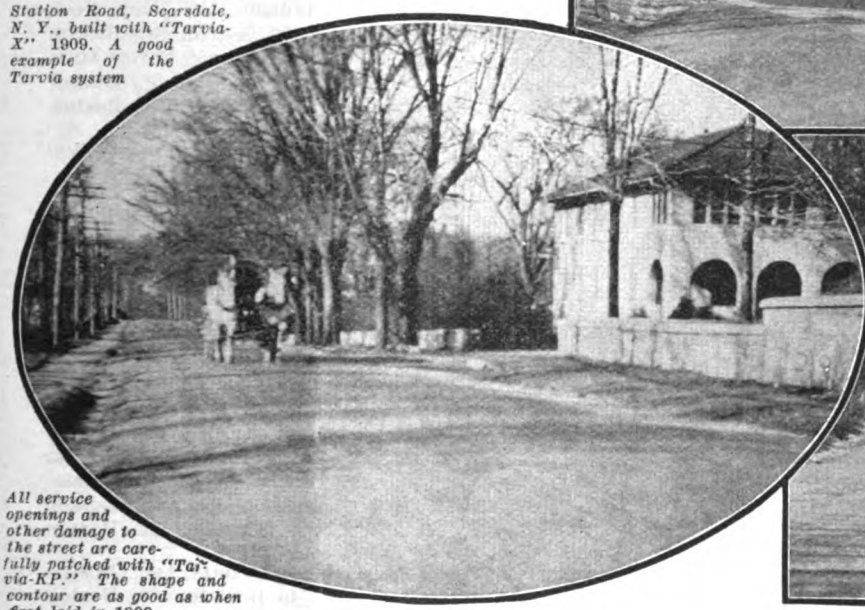
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Tarvia

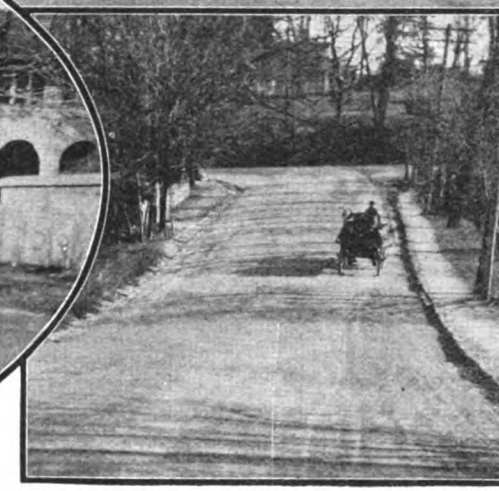
Preserves Roads
Prevents Dust



Station Road, Scarsdale, N. Y., built with "Tarvia-X" 1909. A good example of the Tarvia system



All service openings and other damage to the street are carefully patched with "Tarvia-KP." The shape and contour are as good as when first laid in 1909.



Upper view shows intersection constructed with "Tarvia-KP."

Lower view shows "Tarvia-KP" patching on road maintained with "Tarvia-B."

Have You Discovered "Tarvia-KP"?

Every few weeks another road authority of some city or town or village discovers "Tarvia-KP," (Kold Patch) the remarkable bituminous road-patching material that can be used **at any time of the year.**

Now it's Scarsdale, the beautiful residential village in Westchester County, New York. On October 29th, 1918, Franklin Henshaw, Street Commissioner of Scarsdale, wrote:

> "I regret that I did not 'catch on' to the real value of 'Tarvia-KP' until this year, as I have used over 16,000 gallons of other materials for patching each year, except 1918 when I used 8,000 gallons before trying KP. While the patching material used has been good, 'Tarvia-KP' is better and far more economical, as with 5,000 gallons of 'Tarvia-KP' I have put in very nearly as much patching as I did with 8,000 gallons of other material. Now, next time you run up against a fellow who thinks he has the best there is, make him take a barrel of KP and show him how to use it. You will have a new customer as KP works easier—goes further and makes as good a patch as anything I have ever used. Result—much cheaper and quicker patching from saving in labor."

The time is approaching when the damage caused by the inroads of winter on macadam and bituminous highways and streets must be repaired.

NOW is the time to "catch on to the real value of 'Tarvia-KP.'"

Small holes filled promptly with "Tarvia-KP" patches will save many dollars of expensive repair work later on.

"Tarvia-KP" can be ordered NOW. Freezing won't hurt it; it can be used even in the winter, whenever the roads are free from snow.

Write our nearest office for free booklet showing each step in patching a road with "Tarvia-KP."

Write for illustrated booklet and further information.

New York Chicago Philadelphia Cleveland Cincinnati Pittsburgh Kansas City Minneapolis Nashville Atlanta Duluth Dallas Milwaukee Columbus Richmond

The Barrett Company

Detroit Birmingham Boston St. Louis Salt Lake City Seattle Peoria New Orleans Bangor Washington Johnstown Lebanon Youngstown Toledo Latrobe Bethlehem Elizabeth Buffalo Baltimore

THE BARRETT COMPANY, Limited: Montreal Toronto Winnipeg Vancouver St. John, N. B. Halifax, N. S. Sydney, N. S.

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Space No.	Name	Address
125-126-127B	Henley-Kimball Co.	652 Beacon St., Boston
108-109	Henshaw Motor Co.	1079 Commonwealth Ave., Boston
441-442	Hillman Auto Supply Mfg. Co.	98 Massachusetts Ave., Boston
513-514-515	Hill-Smith Metal Goods Co.	82 Brookline Ave., Boston
121-122B	Hinchcliffe Motor Co.	91 Massachusetts Ave., Boston
424	Holden, George N.	188 Massachusetts Ave., Boston
24-25	Holmes Car.	757 Boylston St., Boston
716	Holophane Glass Co., Inc.	340 Madison Ave., New York
4-BB	Horseless Age.	95 Madison Ave., New York
125-126-127B	Hudson Car.	652 Beacon St., Boston
530	Hunt, E. C.	3 Arborway Court, Forest Hills
Hupmobile, Hall	Hupmobile Car.	574 Commonwealth Ave., Boston
613	Hutchins, George L.	520 Exchange Bldg., Boston
424	Indian Motorcycles.	188 Massachusetts Ave., Boston
519	Jackson, Inc., Chas. A.	711 Beacon St., Boston
34-35	Jackson Motor Car Co.	Brighton Square, Brighton
605	Jameson & Burbank, Inc.	19 Walnut St., Neponset
121-122B	Jordan Car.	91 Massachusetts Ave., Boston
426	Judd, John L.	685 Beacon St., Boston
139-145	King Motors, Inc.	650 Beacon St., Boston
708	Lane Bros. Co.	Poughkeepsie, N. Y.
34-35	Lexington Sales Company of New England.	753 Boylston St., Boston
147	Liberty Cars.	1107 Commonwealth Ave., Boston
119-120	Linscott Motor Co.	566 Commonwealth Ave., Boston
721	Linwood Co., The.	1 Washington St., Boston
505	Linscott Supply Co.	568 Commonwealth Ave., Boston, Mass.
13-17	Locomobile Co. of America.	700 Commonwealth Ave., Boston
615	Lyknu Polish Mfg. Co.	12 Pearl St., Boston
15-19	Macalman, J. H.	96 Massachusetts Ave., Boston
16-20	Maguire Co., J. W.	745 Boylston St., Boston
506	Malton Specialty Co.	213 Columbus Ave., Boston
8-12	Marmon Car.	1249 Boylston St., Boston
604	Massachusetts Mutual Automobile Insurance Co.	40 Central St., Boston
729	Mason Specialty Co.	30 State St., Cambridge
726	McNaull Tire Co. of N. E.	209 Massachusetts Ave., Boston
117-118-132	Maxwell	620 Commonwealth Ave., Boston
138	McFarlan Six.	80 Brookline Ave., Boston
447	McQuay-Norris Mfg. Co.	2808 Locust St., St. Louis, Mo.
3	Mercer Car.	1043 Commonwealth Ave., Boston
423	Middlesex Motor Car Co.	709 Beacon St., Boston
409	Minard's Liniment Mfg. Co.	Framingham, Mass.
P. R. Hall	Mitchell-Lucas Motor Co.	591 Boylston St., Boston
537-538-539	Mitchell & Smith, Inc.	1090-1092 Commonwealth Ave., Boston
423	Monroe Cars.	709 Beacon St., Boston, Mass.
552	Montello, V.	
418	Moreton, Walter H.	214 State St., Boston
715	Morgan Manufacturing Co., Inc., The	Keene, N. H.
102-103	Morse & Co., Alfred Cutler.	705 Beacon St., Boston
21-AA	Motor	119 W. 40th St., New York
516	Motor Vehicle Publishing Co.	71 Murray St., New York, N. Y.
105-106-107	Nash Cars.	640 Commonwealth Ave., Boston
509	National Automobile Association.	9 Park St., Boston
26-27-28	National Car.	661 Beacon St., Boston
712	New England Auto Parts Co.	3 Tremont Row, Boston
137	New England Velie Co.	80 Brookline Ave., Boston
437	New York Lubricating Oil Co.	126 Massachusetts Ave., Boston
105-AA	Norris, F. W., Co.	580 Massachusetts Ave., Cambridge, Mass.
140-144 inclusive	Noyes-Buick Co.	17 Lawton St., Boston, Mass.
622-623	Nutter Electric Equipment Co.	169 Massachusetts Ave., Boston
148-149	Oakland Car.	655 Beacon St., Boston
146	Oldsmobile Car.	940 Commonwealth Ave., Boston
129-130-131	Overland Cars.	533 Commonwealth Ave., Boston
113-114	Owen Magnetic Cars.	839 Boylston St., Boston, Mass.
1	Packard Motor Car Co. of Boston.	1089 Commonwealth Ave., Boston
127A-128	Paige Detroit Co. of N. E.	532 Commonwealth Ave., Boston
14-18	Peerless Car.	660 Beacon St., Boston
541	Perrine Co.	48-52 Cummington St., Boston
717	Petterson Engraving and Manufacturing Co.	311 Main St., Worcester, Mass.

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Space No.	Name	Address
618	Philadelphia Storage Battery Co	92 Brookline Ave., Boston
16 and 20	Pierce-Arrow Cars	745 Boylston St., Boston
32	Premier Car	Boylston St., Boston
607	Pressure Proof Piston Ring Co	107 Massachusetts Ave., Boston
601	Presto Cloth Manufacturing Co., Inc	Toledo, O.
728	Pruden Co., The C. D	Bayard and Warner Sts., Baltimore, Md.
609	Rand, H. L	Shrewsbury, Mass.
33	RauLang Electric Cars	398 and 410 Newbury St., Boston
621	Radium Dial Co	704-5 Little Bldg., Boston, Mass.
119-120	Reo Cars	566 Commonwealth Ave., Boston
102-103	Roamer Cars	705 Beacon St., Boston
105-106-107	Rockwell, Inc., C. P	640 Commonwealth Ave., Boston
33	Rommelfanger, N	398 and 410 Newbury St., Boston
440	Ross Gloss Co	1874 Commonwealth Ave., Auburndale
510	Rowe Calk and Chain Co., The	Plantsville, Conn.
38	Russell Co., W. L	Motor Mart, Park Square, Boston
611AA	Salman, John A	36 Bromfield St., Boston
29	Saxon Car	893-895 Boylston St., Boston
136	Scripps-Booth Motor Car Co	5 Brighton Ave., Brighton
722	Sepco Products Co	753 Dudley St., Boston, Mass.
549	Sewell Cushion Wheel Co	584 Commonwealth Ave., Boston
702	Shaw Tire Co	Room 2, Old South Bldg., Boston, Mass.
502	Simms Magneto Co., The	East Orange, N. J.
36-37	Smith & Sons Co., B. G	661 Beacon St., Boston
407	Specialty Manufacturing Co	637 Massachusetts Ave., Arlington
419-420	Splitdorf Electrical Co	98 Warren St., Newark, N. J.
430-431	Standard Oil Co. of N. Y., N. E. Dept	50 Congress St., Boston
110	Standard Steel Motor Car Co	1110 Boylston St., Boston
530	Stanley Co., Inc., John T	3 Arborway Court, Forest Hills
21	Stanley Motor Carriage Co	Hunt St., Newton
15-19	Stearns-Knight Cars	96 Massachusetts Ave., Boston
608	Stenman Electric Valve Grinder Co., Inc	42 Southbridge St., Worcester
111-112	Studebaker Cars	626 Commonwealth Ave., Boston
22-23	Stutz Cars	677 Beacon St., Boston
104	Stimpson, E. Y	530 Commonwealth Ave., Boston, Mass.
701	S. & N. Compression Plug	63 Oliver St., Boston, Mass.
P. R. Hall	Templar Cars	591 Boylston St., Boston
421-422	Texas Company, The	201 Devonshire St., Boston
556	Tide Water Oil Co	161 Massachusetts Ave., Boston
725	Trexler Rim Compressor Co	1418 Walnut St., Philadelphia, Pa.
536	Underhay Oil Co	73 Batterymarch St., Boston
548	U. S. Air Compressor Co	6526 Carnegie Ave., Cleveland, Ohio
620	U-Sav-Your Manufacturing Co	Warren, Mass.
558	United States Rubber Co., Boston Branch	280-284 Summer St., Boston
30-31	Utterback Gleason Co	793 Boylston St., Boston
432-433	Vacuum Oil Co	61 Broadway, New York
137	Velie Cars	80 Brookline Ave., Boston
526-527	Vesta Accumulator Co	2100 Indiana Ave., Chicago
450	Victory Motor Co	58-60 Brookline Ave., Boston
438AA	Victor Spark Plug Co	250 Devonshire St., Boston
533	Victrolene Co	39 Pearl St., Boston
448-449	Virr Company, David P	1039 Commonwealth Ave., Boston
564	Wakefield Tire Co	North Ave. and Broadway, Wakefield
424	Walker, W. J	163 Massachusetts Ave., Boston
520	Waltham Watch Co	Crescent St., Waltham, Mass.
528-529	Weaver Manufacturing Co	1834 Broadway, New York
102-103	Westcott Cars	705 Beacon St., Boston
521-522	Westinghouse Air Spring Co., The	1105 Commonwealth Ave., Boston
714	Whitman, Bayard J	200 Devonshire St., Boston, Mass.
Special	Whittemore-Hamm Co	Boston, Mass.
617	White, Virgil D	West Ossipee, N. H.
429	White & Bagley Co., The	100 Foster St., Worcester, Mass.
706	Wight, Austin J	592 Congress St., Portland, Me.
709	Will-Hall Truck Co	388 Newbury St., Boston, Mass.
129-130-131	Willys-Knight Cars	533 Commonwealth Ave., Boston, Mass.
503-504	Willard Storage Battery Co	St. Paul St. and Commonwealth Ave, Boston
534-535	Wilson Co., John V	76 Brookline Ave., Boston
552	Wilson, K. R	10-16 Lock St., Buffalo, N. Y.
8-12	Wing, Frank E	1249 Boylston St., Boston
6-10	Winton Company, The	674 Commonwealth Ave., Boston
417	Wire Wheel Corporation of America	1700 Elmwood Ave., Buffalo, N. Y.
404	Wright "Name On" Robe Co	27 Sherwin St., Waterville, Maine

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BOSTON AUTOMOBILE SHOW

March 15 to 22nd (inclusive)

10 A. M. **10:30 P. M.**

The 1919 Boston Automobile Show will Surpass Any Previous Display Ever Held in America.

The showing of passenger cars, accessories, equipment and fittings will far exceed those displayed in previous years.
The 1919 Boston Show will be representative of the whole automotive industry and afford all New England people full opportunity to pass on practically every product that will be sold during the year to come.

Every available foot of display space has been taken. The decorations will be even more attractive than in the past. All arrangements that will add to the pleasure and convenience of attendants has been carefully thought out, planned and executed.

Visitors at this show will view the largest display of passenger cars ever held in America.

Special Orchestral and Band Programmes Afternoons and Evenings

ADMISSION 50 CENTS

Personally Directed by **CHESTER I. CAMPBELL,**
for the
Boston Automobile Dealers Association, Inc.

(When Writing to Advertisers, Please Mention the Automobile Journal.)

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RECONSTRUCTED TIRES

Good for 2,500 to 5,000 Miles

Every motorist who sees his tire wearing away is in constant danger of a puncture or blow-out—will enthuse over our guarantee. Particularly so when it saves half the price of a new tire, this is a fact, and we guarantee it.

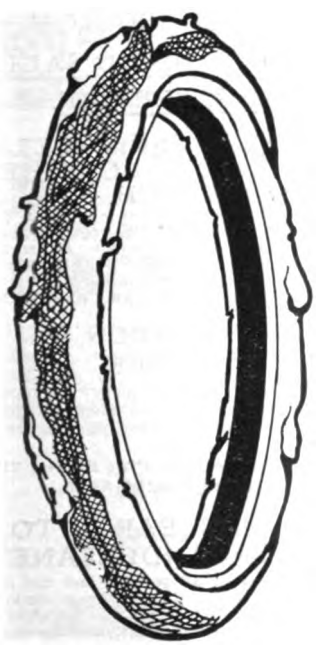
This is a new process, not the ordinary retreading method, but a process that builds a new tire on to the old carcass.—This is what we do:

1.—Turn out an old, worn-out, and useless tire into a new one.

2.—Prevent tread worn, rut worn tires from being utterly ruined.

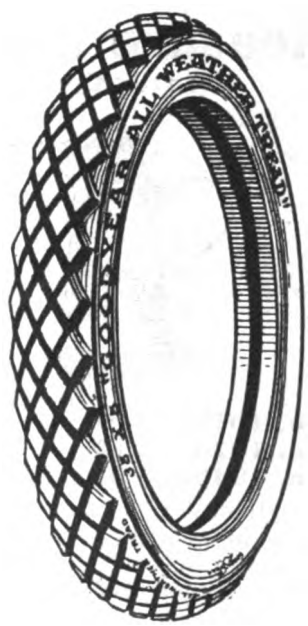
3.—Cover all weak or worn spots, cuts or bruises in the old tire, of which our Reconstructed Tread actually becomes a part, thus doubling the strength of the casing, and making blow-outs almost impossible.

Let Us Prove the Value of This Work



Here Are Our Prices For Rebuilding Your Used Tires

Size	Plain	Non-Skid
30x3	$9.00	$10.20
30x3½	10.20	11.25
32x3½	11.25	12.30
31x4	12.80	14.45
32x4	13.40	14.95
33x4	13.90	15.50
34x4	14.45	16.00
34x4½	17.10	19.75
35x4½	18.20	20.90
36x4½	19.25	22.45
35x5	21.40	24.05
37x5	23.50	26.20



TIRE CONSTRUCTION CO.

129-131 Columbus Ave., Boston, Mass.

(When Writing to Advertisers, Please Mention the Automobile Journal.)

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"The House That Service Built."

New England Distributors for
Gould Storage Batteries



New England Distributors for
Holophane Lenses
The Lens with the Fin

We Wish to Announce to The Automobile Trade

The purchase of the business, good- will stock and equipment of the

MOTOR CAR EQUIPMENT CO. OF BOSTON

Our Automobile Department Is Now Located at 180-182 Massachusetts Avenue.

The combination of our electrical lines with a complete stock of automobile merchandise will enable us to meet from now on every demand of the trade.

Our present organization includes the men formerly associated with the Motor Car Equipment Co. of Boston, as well as the members of our own staff. This ensures the services of specialists, who through training and extended experience are wholly fitted to serve the best interests of our customers.

Careful attention to every detail in connection with all orders, a complete stock to select from, a thoroughly competent and experienced organization, assure a continuation of the SERVICE that has made this house the Buying Headquarters for New England trade.

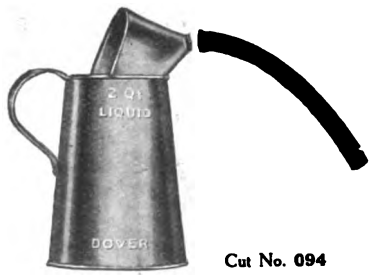
WETMORE-SAVAGE COMPANY

180-182 Massachusetts Ave., Boston, Mass.

NEW DOVER

Flexo Combination Measure and Funnel

Heavily Copper Plated



Cut No. 094

		Dia. Bot'		Total Height	
No. 1010.	**1 qt.**	**4**	**in. x**	**8**	**in.**
No. 1020.	**2 qt.**	**5**	**in. x**	**10¼**	**in.**
No. 1040.	**4 qt.**	**6½**	**in. x**	**12⅛**	**in.**

Length of flexible spout 8 inches, and the diameter of same ⅝ inches—**detachable.** A measure and funnel combined which will conveniently and easily reach any oil hole or tank on any make of car and is a universal measure.

The **tube unscrews** and packs inside of the measure thus making it very compact.

Prices on Application.

Dover Stamping & Mfg. Co.

385 Putnam Avenue, cor. Pleasant St.

CAMBRIDGE, MASS., U. S. A.

FARLEY & McNEILL

EXCLUSIVE ACCESSORIES

105-107 FEDERAL STREET, BOSTON.



NEW ENGLAND SALES AND SERVICE.

MONKEY GRIP SELF-VULCANIZING TUBE PATCH.

The simplest, cheapest and most permanent method of tube repair known. Permanently fixes blow-outs, splits and punctures without heat. Adopted by U. S. Motor Transportation Corps.

Small Cans, $1. Large Cans, $1.75.

O-CO CARBON REMOVER.

Put in cylinders at night, will loosen and soften up carbon so it will be blown out in the morning when you start your engine.

4-Oz. Bottle, 40c; Pint Bottle, 75c; Quart Bottle, $1.25.

GREENLEAF AUTO LUSTRE AND CLEANER.

The best of all polishes and the only real safe polish that we know contains no mineral oil or other paint destroying substances. Drys off quickly, leaving a hard dry surface that dust will not adhere to. Start using it on a new car and you can keep her looking new for years.

Trial Size, 25c; Pint Bottle, 60c; Quart Bottle, $1.

Exhibiting at the Boston Auto Show.
Space 402-403.

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COES *The Standard WRENCH*



WRENCHES that are made for the hardest service. They do not break but grip and hold and their efficiency never lessens.

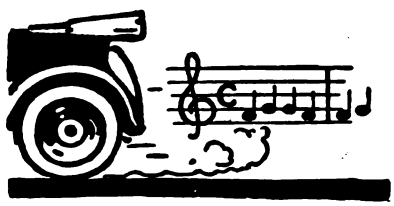
Economy tools as they last longer, give better service and never become useless through wear.

Utility wrenches of the highest order for car owners and repairers as they can be used in compact places and once set hold like a vise.

The Best Wrench
The Cheapest

All dealers carry in stock the exact size to meet your need. They recommend Coes Wrenches as all good dealers have for more than fifty years.

COES WRENCH COMPANY
WORCESTER, MASS.



Motoring Is One Sweet Song

when every place where metal rubs metal is protected by the long-wearing, unctuous, graphite veneer that is provided only by Dixon's Graphite Automobile Lubricants.

They make your car run smoother, quieter, farther per gallon of "gas" and with less upkeep.

Write for Booklet No. 210-G.

DIXON'S GRAPHITE Automobile LUBRICANTS

Made in Jersey City, N. J. by the
JOSEPH DIXON CRUCIBLE COMPANY
Established 1827

NEW DEPARTURE BALL BEARINGS



Strength
Stamina
Service



The New Departure Manufacturing Co., Bristol, Conn.
Conrad Patent Licensee

MASSACHUSETTS MUTUAL AUTOMOBILE INSURANCE CO. · BOSTON · AUTO INSURANCE AT COST WHY PAY MORE

Automobile Insurance

466 persons killed

7,986 persons injured

15,113 automobile accidents in 1918 in Massachusetts alone

Our liability, property damage and loss of use policy protects you fully.

Automobile thieves are growing bolder. Fires often cause high repair charges. You may damage your car in a collision.

Protection against these losses is afforded by a Twin Mutual fire, theft and collision policy.

Send the Coupon for figures to

The Twin Mutuals

40 Central Street,
BOSTON, MASS.

Automobile Mutual Liability Insurance Company
Massachusetts Mutual Automobile Insurance Company

Gentlemen: Please send me information about Twin Mutual automobile insurance on my car.

I am interested in fire and theft ☐ collision ☐ liability and prop. damage ☐

Name of Car	Model and Year	Ins. H. P.	List Cost

I bought car new / second hand ..... Month ..... Year

Is approved extinguisher carried on car?.....

Does anybody operate besides owner?.....

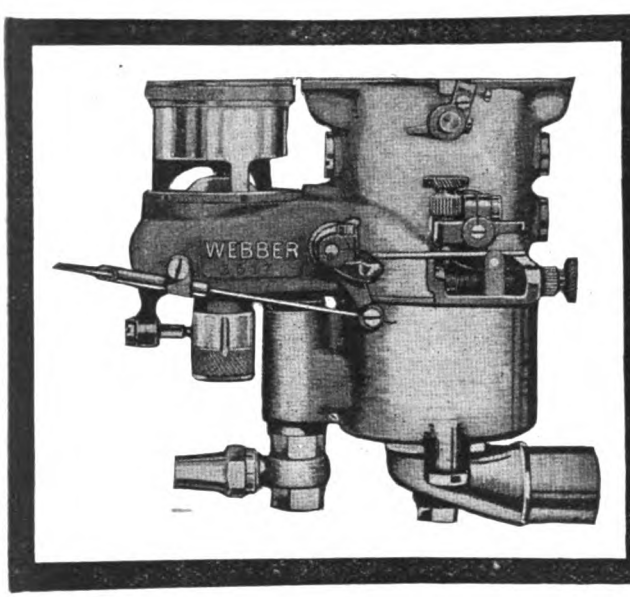
Owner's occupation or profession.....

Name.....

Address.....

A.J.Mr.19

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WEBBER AUTOMATIC CARBURETOR

Its Performance is Gaining Us New Friends Every Day.

EXHIBITING AT THE

BOSTON AUTO SHOW

SPACE 407.

Webber Manufacturing Company

66 STANHOPE STREET - (New York Branch, 1675 Broadway) - BOSTON, MASS.

NEW ENGLAND

Service Representatives for

Connecticut Ignition

All Parts Carried—All Repairs Made.

PARTS Price-List Mailed Upon Request.

We Also Specialize in the Repairing of All Makes of

Starters---Generators---Magnetos

Out of Town Business Solicited on a Basis of YOUR Satisfaction.

V. A. Nielsen Company

390 Newbury St. Tel. Back Bay 2969 BOSTON, MASS.

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B. F. S. Electric Valve Grinder



It has all the good features of the best grinders and then more. IT WILL STAND UP and meet any service test. It is the most efficient, economical time and labor saving tool in any shop. Made on honor—sold on merit. Do not buy any valve grinder before investigating the B. F. S. It will give dependable service yet it costs no more. It is a wonder worker and cuts all labor costs more than half. Two sizes made to meet every requirement.



The B. F. S. Electric Drill

A steady, dependable great time and labor saving tool. Made for work up to 4" diameter. Should be in every shop. The first cost is lost sight of when the earnings are considered.

Write today for complete information. It will surprise and interest you.

B. F. S. MANUFACTURING COMPANY
54 Herman St., Worcester, Mass.

NON-FLUID OIL



Keeps down the up keep-protects every bearing—because it stays put

DON'T forget that every little part that moves requires lubrication—the best lubrication if you would keep down wear and tear and reduce bills for replacements.

NON-FLUID OIL gives bearings better protection than ordinary grease because it is strongly adhesive—stays in the bearings—won't melt with heat or harden with cold or non use.

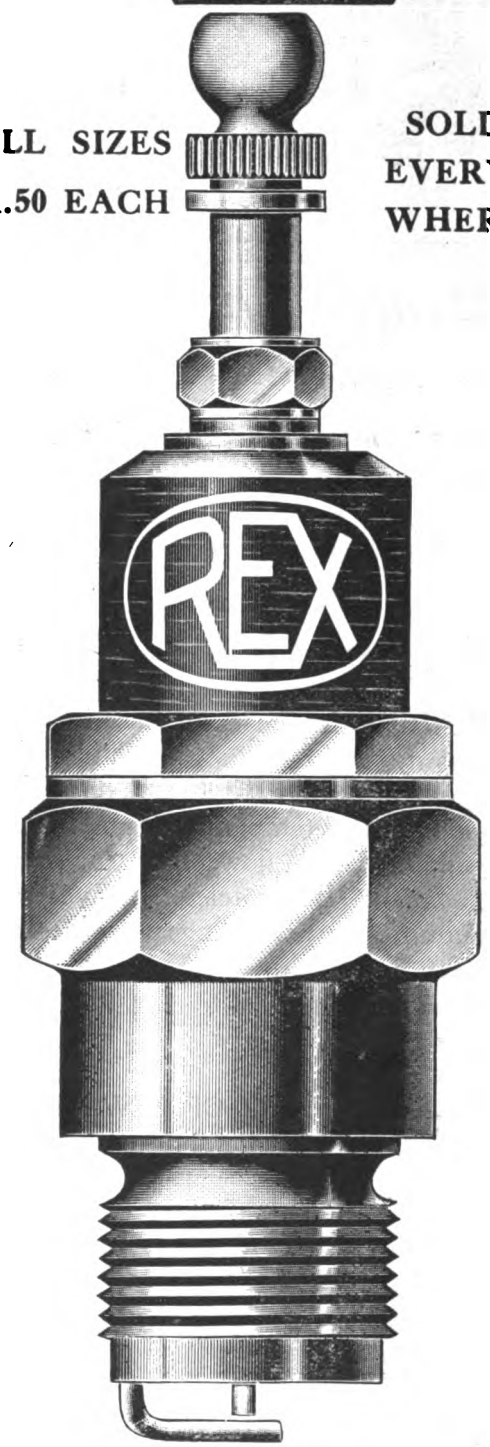
NON-FLUID OIL affords better lubrication at less cost per month. Send for free book on the "Lubrication of the Motor Car."

[illegible] — "K00 Special" For Gears
[illegible] — at all dealers
[illegible] Co. 165 Broadway, New York

REX

ALL SIZES
$1.50 EACH

SOLD EVERY-WHERE



REX IGNITION MFG. CO.
Chicago New York Philadelphia Kansas City San Francisco

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Winter Snows Crowded Traffic

Winter means harder going for your motor car. Then of all times you need a good oil for efficient motor operation.

POLARINE

A host of motorists now know that POLARINE in the crank case means uniformly satisfactory lubrication all through the winter. POLARINE holds its body at low temperatures and highest engine heat—flows freely at start and finish. Burns clean—leaves a minimum of carbon. Plugs power leaks—gives power plus.

Look for the Red, White and Blue SO-CO-NY sign—it shows the way to a smoother running car.

STANDARD OIL CO. OF NEW YORK

Principal Offices

New York Albany
Buffalo Boston

Buy War Savings Stamps

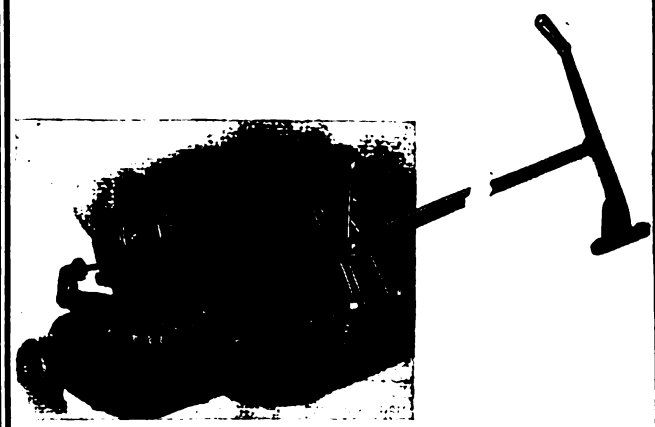
WE SELL SO SOCONY MOTOR GASOLINE NY

STANDARD OIL CO. OF N.Y.

BARRETT SELF STARTER
For Ford Cars

PLEASURE, COMMERCIAL OR TRUCK

**SOLD UNDER FIVE-YEAR GUARANTEE AS TO SERVICE AND DURABILITY.
NOISELESS AND ECONOMICAL.**



The Barrett Motor Starter is the only perfect mechanical starter devised; it has no chains, cables nor pulleys, but works on direct leverage that insures lasting qualities and perfect action. It is simple to attach, requiring no special ability nor mechanical knowledge.

It is operated from the seat by a hand lever placed alongside the emergency brake lever; except for this the whole starter is under the hood and out of sight.

Due to its direct leverage it eliminates 75% of the effort used in cranking.

In case of backfire it releases automatically, eliminating all danger; it will stand any amount of backfiring with no harm to the engine, starter, or operator.

Indorsed by prominent automobile engineers and mechanical experts as mechanically perfect in every respect and the best that has come under their observation.

With the Starter is supplied a Special Primer which vaporizes gas into cylinders of engine, thus insuring easy starting in zero weather.

List Price, Starter and Primer Complete, $25.00

Exclusive agents wanted in every city and county.

Write us at once for full particulars.

See our Exhibit at the Boston Show.

Barrett Motor Starter Mfg. Co., Inc.

1777 Broadway, New York.

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Actual Size of Strainer



A *Real* Gasoline Strainer

Put this Strainer between the feed tank and carburetor; it will hold back every particle of dirt and foreign matter. With the gasoline you are getting today, such a Strainer is an absolute necessity.

Open the plug at the bottom occasionally, and the sediment and water drops right out. Any handy man can install this Strainer—it will pay for itself many times over in one season by the saving in the wear and tear of your motor.

Energetic dealers wanted for exclusive territories — profitable proposition — Write.

$4.00 Complete

Body of die cast aluminum straining mesh cup 120 screen bronze —six square inches of straining surface; cup may be lifted out without disconnecting Strainer from line; straight or elbow unions supplied.

Sent Anywhere in U. S. Post Paid $4.00.

The Holtzer-Cabot *Electric Co.*

125 Amory Street, **Boston, Mass.**

s 34

TO ALL DEALERS

AND OWNERS OF CARS NEEDING PAINTING

Right now, with the Spring months coming, there is a good opportunity for you to materially increase your profits if a dealer and save money if a consumer—

SIMPLE SYSTEM——three coat work——AUTOMOBILE PAINTING

ANYBODY CAN PAINT A CAR IN 3 DAYS

and completely obliterate the marks of the past usage with a hard, wearing, beautiful surface on all parts.

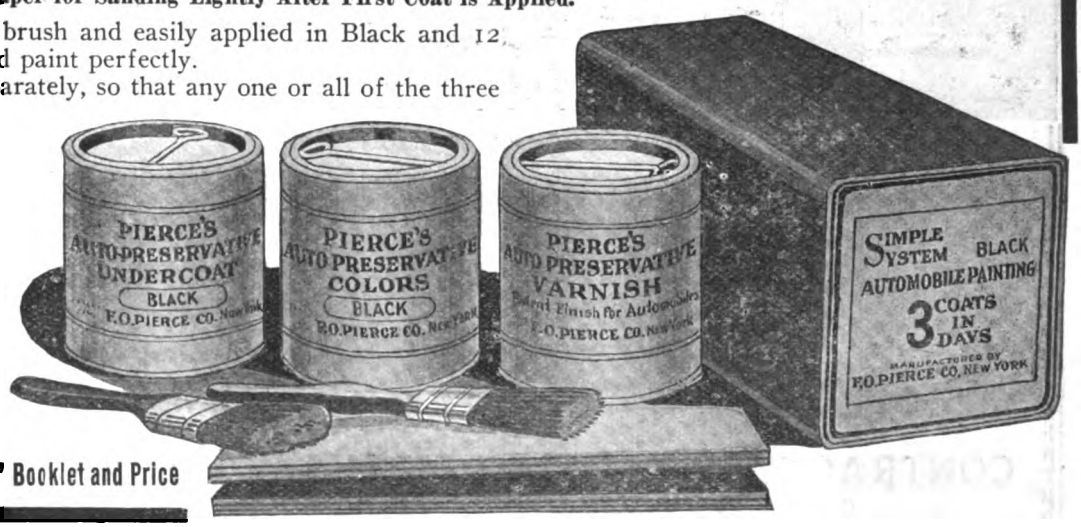
The Three Coats Put Up In Sets Comprising:

1 Can Auto Preservative Undercoat for First Coat.
1 Can of Auto Preservative Color Coat for Second Coat.
1 Can of Auto Preservative Varnish for Third Coat.
1 Sheet No. 0 Sandpaper for Sanding Lightly After First Coat is Applied.
1 Brush for First and Second Coats.
1 Varnish Brush for Finishing Coat.
2 Sheets No. 1 Sandpaper for Cleaning Car.

All ready for the brush and easily applied in Black and 12 colors, which covers old paint perfectly.

Sold in sets or separately, so that any one or all of the three coats may be had as needed.

Fifty years of experience behind every can. Quality guaranteed.



Manufactured only by

F. O. PIERCE COMPANY,

12 West Broadway, N. Y.

Write for "Simple System" Booklet and Price

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SPECIAL SALE
AUTO TIRES

GUARANTEED 4000 MILES

If a tire fails to give service of 4000 miles we will replace it with another tire for ½ price marked below:

Size	Plain	Non-Skid	Tube	Size	Plain	Non-Skid	Tube
28x3	$6.45	$7.45	$2.30	34x4	$14.95	$15.95	$3.45
30x3	7.45	8.35	2.15	35x4	15.45	16.95	3.55
30x3½	8.95	9.95	2.40	36x4	15.95	17.50	3.60
31x3½	9.45	10.45	2.45	34x4½	18.45	20.45	4.30
32x3½	9.95	10.90	2.50	35x4½	18.95	20.95	4.40
34x3½	10.45	11.30	2.80	36x4½	19.45	21.45	4.45
31x4	13.45	14.60	3.20	37x4½	19.95	21.95	4.50
32x4	13.95	14.95	3.30	35x5	20.95	23.45	5.15
33x4	14.45	15.45	3.35	37x5	21.95	24.75	5.30

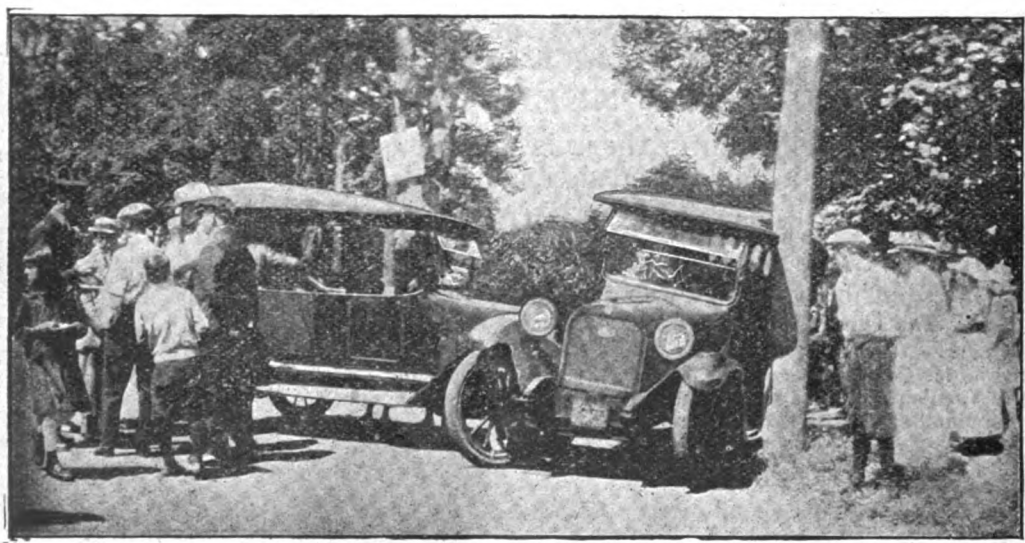
Deduct 2 Per Cent. When Check or Cash Accompanies Order.
10% Deposit Required on All C. O. D. Orders.
We Carry a Full Line of New and Reconstructed Tires.

ATLAS TIRE COMPANY,

Tires and Tubes Shipped Express Prepaid

Telephone Poplar 2970

822 N. BROAD STREET, PHILADELPHIA, PA.



WE CAN SAVE YOU MONEY ON THE FOLLOWING KINDS OF LIABILITY INSURANCE

- Workmen's Compensation
- Employer's Liability
- Public Liability
- Auto---Pleasure
- Teams
- Auto Trucks
- Property Damage
- Landlords'
- Elevator
- Owners' Contingent

IF THIS HAPPENS TO YOU

You will want an Automobile Insurance policy, FAIR and WITHOUT TECHNICALITIES, one that gives you FULL PROTECTION and the most for your money, IN A COMPANY whose main object is to settle any difficulties you may get into in the SHORTEST POSSIBLE TIME and with the LEAST trouble to you.

The Contractors Mutual Liability Insurance Company will give you this at the lowest possible price, and in addition will

Save you money:—
By our "Deposit Clause"
And by the dividend we pay.

Before placing your insurance you should become familiar with what this deposit clause will do for you, the price and service we can give you and the money you can save.

CALL—WRITE OR TELEPHONE.

CONTRACTORS MUTUAL LIABILITY INSURANCE COMPANY

10 TREMONT STREET, BOSTON, MASS.

(When Writing to Advertisers, Please Mention the Automobile Journal.)

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TRADE OUTLET

TIRES AND TUBES

The quality of our tires and tubes is superlative, the price cannot be equalled and our service cannot be excelled.

A satisfied customer is our best asset,—We Must Satisfy You.

The following popular high-grade makes are to be found in our complete stock:

Hood—United States—Fisk—Ajax—Firestone—Lee—Star Diamond—Federal—Batavia

Size	Tires	Tubes
30x3½	$11.25	$2.25
31x3½	12.00	3.05
32x3½	14.00	3.35
31x4	19.00	3.75
32x4	19.50	4.00
33x4	19.75	4.10
34x4	20.00	4.50
34x4½	27.00	4.75
35x4½	29.50	5.10
36x4½	27.40	5.50
36x5	30.50	5.25
37x5	30.25	5.50

ALL OUR TUBES ARE FIRSTS—GUARANTEED

REPUBLIC TIRES

Regular Clincher only—while they last—ONE-HALF the list price.

Size	Our Price	List Price
29x3½	$11.95	$23.90
32x3½	12.38	24.75
30x4	18.87	37.75
31x4	20.00	38.70
32x4½	27.50	45.15
33x5	32.50	65.10
34x4½	28.00	56.25
35x5	34.50	69.00
37x5	36.50	73.20

GUARANTEED for 3500 MILES.

PURITAN TIRES

Made By Hood Rubber Co.

WE WILL SAVE YOU 33 1/3%.

On these popular high-grade Tires. Guaranteed by us for 3500 miles and adjusted on this basis. All Sizes. All Styles.

	Our Price	Hood List Price
30x3½	13.95	20.90
31x3½	15.74	23.60
32x3½	15.74	27.75
31x4	20.90	31.80
32x4	21.80	32.70
33x4	22.34	33.50
34x4	22.84	34.25
34x4½	30.60	45.90
36x5	38.84	58.25
37x5	39.44	59.15

OUR GUARANTEE TO DEALERS

"Your Money's Worth in Mileage or We Make Good."
Every Tire We Handle Is Manufactured for a "FIRST."
We Can Offer the Best Prices, Consistent With Quality Tires—Write Us Today

GEORGE GROW AUTOMOBILE & TIRE COMPANY

321-323 Columbus Ave., Boston, Mass.

USED BODIES

We carry the largest stock of USED BODIES in New England.

$25. and up

PACKARD, PIERCE-ARROW, MITCHELL, LENOX, POPE HARTFORD, FIAT, HUDSON, CADILLAC, FORD, CASE WHITE and other makes.

Big Stock of New and Used Fenders, Cushions, Etc.

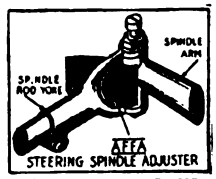
AUTO BODY EXCHANGE

414 MAIN ST., CAMBRIDGE, MASS.

Phones: Camb. 1691 or Brighton 1184-W.

AFFA
Trade Mark

SPECIALTIES for the FORD



Copyright Aug. 17, 1917

They stop the rattle in:—
The Brake Rod Supports
The Brake Rod Clevises
The Spark and Throttle Rods
The Steering Spindles

They serve many other useful purposes and are inexpensive.

JOBBERS, DEALERS, write for prices and folder which mean money for you.

Price 50 cents per set

Affa Specialty Co., 34-D Southbridge St., Worcester, Mass.

Classified Advertising
BRINGS BIG RETURNS
20 Cents a Line, Seven Words to Line.

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TRADE OUTLET

U USE USED TIRES GOOD FOR 1000 MILES

ESTABLISHED 1908

We do not try to give you impossible mileage, that cannot be done. But on a 1000 mileage basis our prices are lower than any in the country.

These used tires are absolutely guaranteed to give the mileage we tell you they will give. If not, ship them back to us and we will give you a real proper adjustment. No excuses, no red tape. Our stock is complete. You can order any size, any make, any style, and they will reach you within 24 hours.

Compare our prices

Size	Price	Size	Price
30x3	$4.50	34x4	$9.00
30x3½	$4.95	35x4½	$12.00
32x3½	$6.00	36x4½	$12.00
31x4	$8.50	35x5	$13.50
32x4	$8.50	36x5	$15.00
33x4	$8.50	37x5	$13.50

NON-SKIDS, 10% HIGHER. TIRES SHIPPED C. O. D.

We have also in stock all odd size tires, including 34x3½, 35x4, 32x4½, 33x4½, 37x5½, 38x5½, 39x5, 39x6 and 36x6.

USED TIRE OUTLET COMPANY

K. L. BRAYTON, Manager

191 MASSACHUSETTS AVENUE, BOSTON, MASSACHUSETTS

NEW TOP WITH SIDE BACK CURTAINS

BEVELED OR PLAIN GLASS

If the top of your car has become shabby in appearance, or worn, a BAY-STATE TOP with Side Back Curtains will give you a top as good as new. Made of the best materials, with extra strong stitching and fitted with two panes of glass, either beveled or plain.

FOR ALL MAKES AND MODELS

and can be fitted on by yourself. We supply all necessary tacks and binding. In ordering give the name, year and model of your car.

Write us for price list. Special prices for Ford cars.

To Dealers: Write Us for Trade Discounts

BAY STATE TOP COMPANY

35 STANHOPE ST., BOSTON, MASS.

RAY CAVANAUGH

883 BOYLSTON STREET, BOSTON, MASS.

Representing—

HOWE LAMP & MFG. CO.
Chicago, U. S. A.

RUSSELL MFG. CO.
Middletown, Conn.
Rusco Brake Lining, Etc.

SIDEL RATTNER MFG. CO.
Brooklyn, N. Y.
Red Wonder Pumps.

THE GREB CO.
Boston, Mass.
Greb Wheel Pullers & Rim Tools.

Exhibiting at the Boston Show.
SPACE 443.

FORD PARTS

50% TO 75% OFF LIST.

These Parts are in perfect condition and will give long service.

Kingston & Holley Carburetor....$2.50
Ford Wheels.....$1.25
Ford Tail Lamps.....$1.50

Parts for 1917 Cadillac, Stearns-Knight, Buick, rear ends for all cars. Kissel, 1914 Studebaker, Overland, model 79; Lenox, Stoddard-Dayton, Michigan, Oakland and Lozier; Gray & Davis generator and starter; Delco lighting system; high-tension Bosch and other magnetos; Stromberg and other carburetors, generators, starters, Kellogg pumps, headlights, electric and Presto, and windshields, tires, rims and tubes from 30x3 to 37x5.

NEW ENGLAND AUTO EX., INC.
173-175 Webster Ave., Cambridge, Mass.

GIANT SEARCHLIGHT

The highest quality lowest priced lamp produced.

List price, with Mirror.....$6.00
List price, without mirror.....$5.00

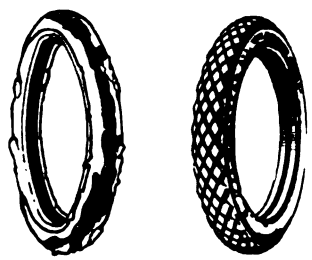
Sold by all dealers.

CULVER-STEARNS MFG. CO.,
Worcester, Mass. Detroit, Mich.

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TRADE OUTLET

BOSTON RETREAD TIRE CO.



Before After

OUR METHOD OF RETREADING IS DIFFERENT FROM OTHERS.

We use all Goodyear first quality stock and retread bands and can absolutely guarantee from

3000 to 3500 Miles.

We will replace a new tire for every one that our work does not give satisfaction.

Tires called for and delivered. We pay express charges one way on all out-of-town orders.

Price List Mailed Upon Request.

BOSTON RETREAD TIRE CO.
70 Clarendon St., Boston, Mass.

SPECIAL SALE
— OF —
SLIGHTLY USED TIRES

We have a large stock of used tires and in order to make room to enlarge our retreading department we must sell this stock of tires at once.

WRITE—WIRE—OR CALL.

No.	Size	Price	No.	Size	Price
200	30x3	$3 to $4.50	2238	34x4	$7 to $12.00
875	30x3½	$4 to $6.50	643	35x4½	$8 to $14.00
215	31x4	$6 to $9.00	171	34x4½	$8 to $14.00
2217	32x3½	$6 to $7.50	1458	35x5	$9 to $25.00
204	33x4	$7 to $9.50	318	33x5	$9 to $20.00
1107	32x4	$7 to $10.00	963	36x4½	$8 to $14.00
72	33x4½	$7 to $12.00	1238	37x5	$8 to $20.00
465	32x4½	$8 to $15.00	62	38x5½	$12 to $25.00

During this sale we will allow a 5% discount when check or money order accompanies the order.

Personal attention to all mail orders. Shipped same day as received.

Boston Auto Tire Exchange
304 Columbus Ave., Boston, Mass.
Phone Back Bay 1147 or 7329.

AUTO PARTS SAVE 50-90% FOR 400 CARS

POPE, PACKARDS, PIERCE, BUICK, STEVENS-DURYEA, KNOX, OVERLAND, ETC.

Motors	$25.00 up	Presto Tanks	$ 4.50 up
Magnetos	4.00 "	New Spotlights	2.00 "
Carburetors	3.00 "	Generators	10.00 "
Rear Axles	15.00 "	Gears	1.00 "
Front Axles	5.00 "	Bearings	1.00 "
Cylinders	5.00 "	Radiators	10.00 "

$12 Diamond Bumpers.....$5.50

Jobbers in Bankrupt Auto Supplies.

BRIGHTMAN AUTO EXCHANGE
84 Wooster St., Hartford, Conn.

Write to Brockton
— FOR —
AUTO PARTS

REAR ENDS, TRANSMISSIONS, GEARS, REAR AND FRONT AXLES, WINDSHIELDS, GENERATORS, ETC.

We can save you real money on any auto part for any make of car.

Write For Our Price List.

A. Berger & Son
104 OTIS ST. BROCKTON, MASS.

GEO. LAWRENCE INC.
PERFECTION SPRING SERVICE STATION

We carry in stock the largest supply of Automobile Springs in New England.

ALSO RESETTING AND REPAIRING.

Special Springs made to specifications.

24 CAMBRIA ST., BOSTON, MASS.

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TRADE OUTLET

IDLE TRUCKS COST MONEY

The only way to make your trucks make money is to keep them moving. When your ignition is bad, gone or faulty, your service is broken.

We Repair Magnetos—Distributors—Coils

To New England Truck Owners we can offer a fully equipped plant to do every kind of magneto and electrical repairs. We are prepared every hour to do high grade work, quickly and at a low cost. And

While We Repair Your Magneto, We Loan You Another One.

If you bring or send us your magneto today, we return it the following day. For this service there is no extra cost. In other words, we "PROVIDE SERVICE FOR THOSE WHO SERVE." When you have magneto troubles see us. We have on hand at all times

MAGNETOS, COILS, DISTRIBUTORS, TIMERS—PARTS FOR EVERY STANDARD IGNITION.

Bosch, Splitdorf, Eisemann, Dixie, Berling, Magnetos and Parts always on hand.

The Magneto Shop

JOHN BRUNSWICK.

187 Massachusetts Ave. Boston, Mass.

TRUCK OWNERS
Let's help you keep the truck moving. Write us now.

REBUILT TIRES

If you have a tire that is worn to the fabric, let us rebuild it; you will get quite frequently more mileage than the original. Our process includes cutting off the old tread, repairing all weak spots, building up new cushion, breaker and tread, and building in a two or three-ply reliner of the best fabric. On this basis of rebuilding we stand back of our rebuilt tires.

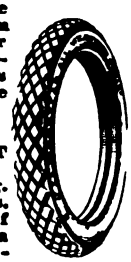
3 TIRES FOR THE PRICE OF ONE



Why pay high prices for new tires when we can give you three tires for the price you usually pay for one and you get three times as much mileage? We claim that our rebuilt tires will give you good service. Our purchasing power is so great that we are never undersold. Now it is up to you to take advantage of this proposition, as it is the easiest way we know of to save money on your tire bills.

TO MAKE MONEY IS TO SAVE MONEY
YOU CAN DO SO BY HAVING YOUR TIRES REBUILT BY US.

All the leading tire factories recommend rebuilding. We rebuild our tires with treads made by these factories. If you can get three times as much mileage out of three tires as you would pay for one, why is this not a saving proposition? Our tires are used by doctors, ambulances, taximen and express trucks. If it pays them, it will pay you.



Here Are a Few of Our Prices on REBUILDING YOUR TIRES:

30x3	$8.75	32x4	$13.15	36x4½	$19.00
30x3½	9.95	34x4	14.20	35x5	21.15
32x3½	11.00	34x4½	16.85	37x5	23.25
31x4	12.55	35x4½	17.95		

Non-Skids 10% Extra.

We Have a Large Stock of Retreaded Tires for the Prices Below:

30x3	$9.25	32x4	$13.65	36x4	$19.50
30x3½	10.15	34x4	14.70	35x5	21.65
32x3½	11.50	34x4½	17.35	37x5	23.75
31x4	13.00	35x4½	18.45		

Non-Skids 10% Extra.

To Those Who Have Never Tried Retreaded Tires

We rebuild your tire and send it to you; if it proves satisfactory you pay the express company, if not send it back to us at our expense and we will give you the market value for it.

Dealers Write for Our Special Proposition

BOSTON AUTO TIRE EXCHANGE

304 COLUMBUS AVE., BOSTON. TEL. BACK BAY 7329-1147.

Atwater-Kent Sales Co., of New England

883 BOYLSTON ST., BOSTON, MASS.

Official
SALES AND SERVICE
For New England.

Complete stock of parts always on hand.

Write for Price List.

Exhibiting at the Boston Show.
SPACE 443.

I HAVE GIVEN UP

the Goodyear solid tire contract and have the following Goodyear S. V. Truck Tires in stock. All are First Quality and guaranteed.

2 32x3½ 4 36x5 1 36x6
8 40x5 8 40x6

The prices on these tires will interest any truck owner.

NATHAN E. PACKARD.
219-221 Warren Ave., Brockton, Mass.

100 Auto Recipes and Suggestions for 25 cents. Save auto repairs by writing today. We do this to advertise our association. Am. D. B. Assn., Inc, 948 East Fourth St., St. Paul, Minn.

(When Writing to Advertisers, Please Mention the Automobile Journal.)

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TRADE OUTLET

HARRY M. O'BRIEN

245 COLUMBUS AVE., BOSTON, MASS

EXCLUSIVE AGENTS

DELION TIRES

5000 MILE GUARANTEE

DISTRIBUTORS OF ALL MAKES OF TIRES
H O SPECIAL RED TUBES
COLUMBIA DRY CELLS
PURITAN SOAP
PURITAN POLISH
AMALIE SOAP AND GREASE
AUTO HORNS
WEED CHAINS
EDISON MAZDA AUTO LAMPS
FIRE EXTINGUISHERS
BRAKE LINING
SPARK PLUGS—DERF, BERGIE
TIRE COVERS
SPEDOLENE GREASE

INLAND ONE-PIECE PISTON RING
TOOL BOXES
BUMPERS
RELINERS
FUSES
PRESTO TANKS

The lines we handle are good sellers and repeaters.

We are prepared to take cars and quote dealers lowest discounts for immediate delivery.

During Boston Show Week make this your headquarters. We are always glad to see out of town accessory dealers.

WE CARRY A COMPLETE STOCK OF

FORD SPECIALTIES AND ACCESSORIES

Write AUTO PARTS CO. For

REPAIR PARTS

Our new bulletin of used parts and prices now ready.

With this bulletin in your shop you can supply repair parts for all makes and models of cars listed and increase your repair business.

It Is Free. Write for It Today.

AUTO PARTS CO.

4103 Olive Street, St. Louis, Mo.

AUTO PARTS.

50% to 90% Off List.

24 Hour Service. Unlimited Stock.
Pope-Hartford, Columbia, Reo, Overland and 200 other makes.

Motors,	$20.00 up	E. Presto Tanks,	$4.00
Magnetos,	$3.50 up	B. Presto Tanks,	$4.75
Cylinders,	$3.00 up	Bearings,	50c up
Springs,	$1.00 up	Rims,	$1.00 up

1000 Other PARTS Bargains.

If you want any part not listed here, Write Us—We Have It.

Conn. Auto Parts Co. Inc.

1070 Main St., Hartford, Conn.

EXPERT REPAIRING; every known Magneto and Ignition System, Starters, Motors, Generators. **Magneto Exchange and Repair Shop, 269 Halsey Street, Newark, N. J.**

SERVICE AUTO-LITE STATION

BOSTON'S Finest Equipped Auto Electric Repair Service

With a staff of trained electrical men we can offer auto owners expert service, coupled with promptness and personal attention to all electrical repair problems. We also repair any electrical equipment used on a motor car.
Official service and parts representative for
AUTO-LITE LIGHTING AND STARTING SYSTEMS.
Complete Stock of
GENUINE PARTS.
All Work and Parts Guaranteed.

William H. Flaherty Co.

74 CUMMINGTON ST., BOSTON, MASS.

Why We Can Save You Money On Your Tires

Our business is selling tires only—which results in specialization—one store, one fixed small overhead—we buy direct from the standard tire manufacturers—no middlemen's profit and we buy right because we pay cash. "Volume buying—Volume selling" is the direct answer to low tire cost to car owners. Our stock of tires and tubes are new, clean and fresh and we do not sell a tire which in our opinion can never give mileage. Our one thought is to give you absolute satisfaction and on this basis we ask you to send us your order. Remember, you must be satisfied.

	Guaranteed Tires	Guaranteed Tubes		Guaranteed Tires	Guaranteed Tubes		Guaranteed Tires	Guaranteed Tubes
30x3	9.25	2.35	32x4	$18.65	$3.60	35x4½....	$27.50	$4.50
30x3½....	11.90	2.80	33x4	19.25	3.75	36x4½....	27.95	4.00
32x3½....	13.75	3.10	34x4	20.00	3.85	35x5	31.45	5.50
34x3½....	15.95	3.20	36x4	20.95	3.95	36x5	35.05	5.60
31x4	18.50	3.40	34x4½....	26.20	4.20	37x5	33.35	5.70

NON-SKIDS, 10% EXTRA.

Goods Ordered by Mail Sent C. O. D., Subject to Examination.
MAIL ORDERS Receive Careful and Prompt Attention.
Every Order We Send by Mail Is Carefully Inspected Before Leaving Our Store.

General Auto Tire Co.

Tel. Beach 7434 **187 Columbus Ave., Boston**

AUTO PARTS—At Your Own Prices. We can supply parts for nearly every make of car. 648 Packards, Interstate Fours, also Truck parts, GMC and other makes.

Write us for Parts. We have them.

STRANDWAY AUTO PARTS CO.,
192-196 H. St., South Boston, Mass.

We Are Exclusive
SELLING AGENTS
for the N. F. G.
CARLISLE CORD TIRE.
Dealers write for our special proposition.
CAMBRIA TIRE EXCHANGE.
204 Columbus Ave., Boston, Mass.

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TRADE OUTLET

Announcing 1919 Lines
To Accessory Jobbers

X Laboratory, Boston, Mass.
X Radiator Liquid-X Truck and Tractor Liquid

Reflex Ignition Co., Cleveland, Ohio
Reflex Spark Plugs

U. S. Metal Goods Co.
Parts for Ford Cars

Powers Manufacturing Co.
Automobile Textile Products

Goldich Foundry Co.
Brass, Bronze and Aluminum Castings
Kraker Bronze Thrust Plates and Bearings

Woodtite Laboratories
Spok-Tite, Wood-Tite, etc.

Yours for Quality, Courtesy and Service

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ON
FORD USED CARS

To visitors at the Boston Auto Show, who are contemplating the purchase of a Ford car, we can offer real bargins. Priced

$250. and upwards

We Invite You to Visit Our Show Rooms.

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Oldest Ford Dealer in New England.
39 STANHOPE STREET, BOSTON, MASS.

Standard Repair Parts
for
Magnetos, Spark Coils, Ignition Systems



Quality — *Genuine* PLATINUM AND TUNGSTEN POINTS — First



Graphite, Carbon and Metal Brushes

H. & L. MFG. CO.
300 West Broadway, New York
Established 1908

OUR DOUBLE TREAD TIRES

are saving money for our customers all over the country. They can do as much for you. Write for catalogue and price list immediately and see the offer we are making you.

M. Liben & Co.
205-J W. 48th Street, NEW YORK CITY.

MOTOR BARGAINS

A few unused Herschel-Spillman heavy six-cylinder motors. 4-in. bore, 5½ in. stroke, weighing about 850 lbs., for sale at $200 each, less than half of present cost. Excellent for boat or automobile use. A big bargain.

PARKER MOTOR TRUCK CO., Milwaukee.

PORTABLE GARAGES.
Send for Catalogue.
THE J. A. CATHERMAN MANUFACTURING CONCERN.
Beaver Springs, Pa.

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PAIGE

The Most Beautiful Car in America

THE tremendous plans which we have made and perfected for the Paige-Detroit Motor Car Company are based upon three elemental facts:

The overwhelming demand for Paige Products that makes necessary this huge increase in Paige Production.

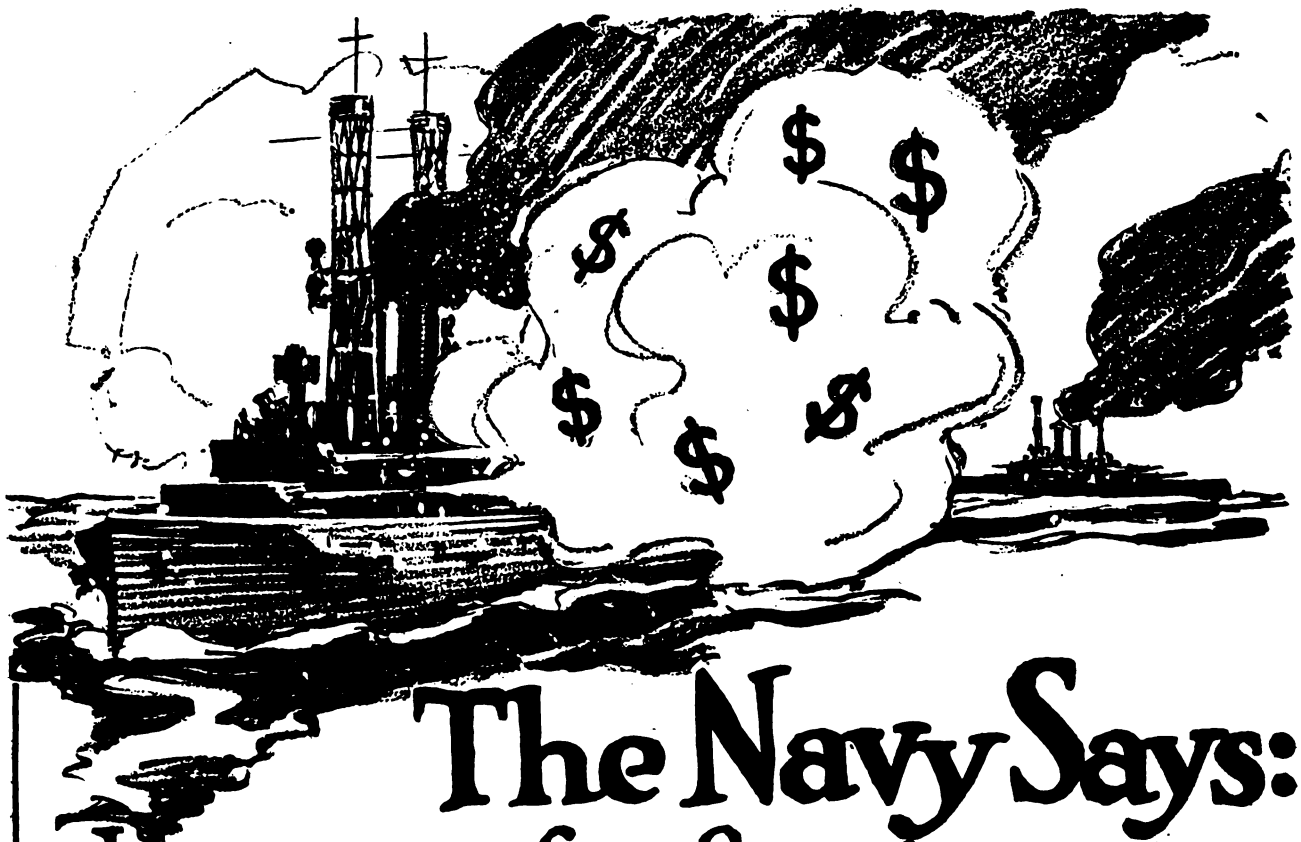
Our enormously increased manufacturing facilities which make it possible for us to reach and maintain this huge Production.

The strength, resources and enthusiasm of Paige Dealers who stand ready and eager to over-sell any Production Paige can reach.

The Paige Dealer organization is growing today more rapidly than at any time in the history of the Company. The far-sighted, alert, money-making Dealers of the country are mobilizing under the Paige banner, not only because they *know* this overwhelming popularity of Paige Products, but, also, because they see in these Paige Plans an opportunity to share with one of the most successful and substantial of manufacturing houses a period of unparalleled prosperity; to secure a varied and vastly profitable line with prestige that makes a Paige Dealer a leader in his own territory and his own community.

PAIGE-DETROIT MOTOR CAR COMPANY: DETROIT, U. S. A.

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The Navy Says:
It's a great life—if you don't weaken

The war is over. We and our allies have won the victory the good of the world demanded. Democracy, honor and justice were proved triumphant.

Some people seem to think we're all through.

We're not. It was, for us, essentially a war of preparation. Our dollars counted heavily and saved thousands of lives. The discovery that America *would* fight, fight with everything she possessed in men, materials and money, aided greatly in the collapse of Germany

It took a great many dollars, but that is infinitely better than a great many lives.

Some of the war bills have yet to be paid, and we have not finished our job until the account is settled.

Don't weaken now.

Because it's cleaning up our job, because our country needs the money, because victory and peace are ours, because we are thankful the war meant to us for the most part dollars rather than lives—let us "carry on," finish the task and subscribe to the

LIBERTY V LOAN

Victory Liberty Loan

The "Clean-up" Button

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THE AUTOMOBILE JOURNAL.

Prepared by American Association of Advertising Agencies cooperating with United States Treasury Department

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RECONSTRUCTED TIRES

Good for 2,500 to 5,000 Miles

Every motorist who sees his tire wearing away is in constant danger of a puncture or blow-out—will enthuse over our guarantee. Particularly so when it saves half the price of a new tire, this is a fact, and we guarantee it.

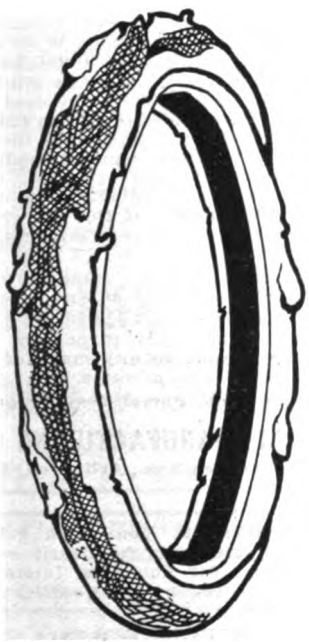
This is a new process, not the ordinary retreading method, but a process that builds a new tire on to the old carcass.—This is what we do:

1.—Turn out an old, worn-out, and useless tire into a new one.

2.—Prevent tread worn, rut worn tires from being utterly ruined.

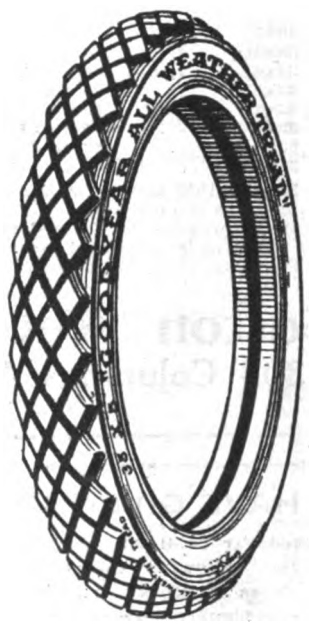
3.—Cover all weak or worn spots, cuts or bruises in the old tire, of which our Reconstructed Tread actually becomes a part, thus doubling the strength of the casing, and making blow-outs almost impossible.

Let Us Prove the Value of This Work



Here Are Our Prices For Rebuilding Your Used Tires

Size	Plain	Non-Skid
30x3	$9.00	$10.20
30x3½	10.20	11.25
32x3½	11.25	12.30
31x4	12.80	14.45
32x4	13.40	14.95
33x4	13.90	15.50
34x4	14.45	16.00
34x4½	17.10	19.75
35x4½	18.20	20.90
36x4½	19.25	22.45
35x5	21.40	24.05
37x5	23.50	26.20



TIRE CONSTRUCTION CO.

129-131 Columbus Ave., Boston, Mass.

(When Writing to Advertisers, Please Mention the Automobile Journal.)

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TRADE OUTLET

MAGNETO AND ELECTRICAL REPAIRS

Any Starting, Lighting, Ignition Systems

The Repair Work turned out of this shop is of the highest merit—because it is repaired right, by men who are skilled.

We can offer to garages and service stations a fully equipped plant to do their magneto and electrical repairs.

We are repairing every day

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BOSCH MAGNETOS
SPLITDORF MAGNETOS
EISEMANN MAGNETOS
BERLING MAGNETOS
WESTINGHOUSE SYSTEMS
K. W. IGNITION
CONNECTICUT
DYNETO

Send in your Magneto, Lighting or Starting system, etc., and let us do the work—it will be shipped back, working fine—and in 24 hours.

REBUILT MAGNETOS
PLATINUM PARTS
GENERATOR BRUSHES
BEARINGS, ETC.
ELECTRICAL SUPPLIES

THE MAGNETO SHOP

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SPECIAL SALE

— OF —

SLIGHTLY USED TIRES

We have a large stock of used tires and in order to make room to enlarge our retreading department we must sell this stock of tires at once. All standard makes—including

GOODYEAR, GOODRICH, FIRESTONE, FISK, AJAX, MILLER, LEE, ETC.

WRITE—WIRE—OR CALL.

Size	Price	Size	Price
30x3	$3 to $4.50	34x4	$7 to $12.00
30x3½	$4 to $6.50	35x4½	$8 to $14.00
31x4	$6 to $9.00	34x4½	$8 to $14.00
32x3½	$6 to $7.50	35x5	$9 to $25.00
33x4	$7 to $9.50	33x5	$9 to $20.00
32x4	$7 to $10.00	36x4½	$8 to $14.00
33x4½	$7 to $12.00	37x5	$8 to $20.00
32x4½	$8 to $15.00	38x5½	$12 to $25.00

During this sale we will allow a 5% discount when check or money order accompanies the order.

We also have for immediate clearance over 500 odd size used tires. If your size tire is not listed here, write us.

Personal attention to all mail orders. Shipped same day as received.

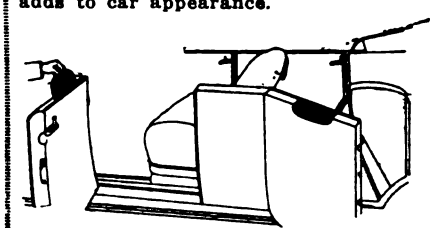
Boston Auto Tire Exchange

304 Columbus Ave., Boston, Mass.

Phone Back Bay 1147 or 7329.

Carroll Door Protector

It protects the paint on the doors and adds to car appearance.



Patent Pending

The paint where the hand grasps the door in opening and closing is invariably marred or injured by finger marks.

Other protectors have to be glued or screwed on the outside of the door and usually curl at the edges. The Carroll Door Protector is attached to the inside of the door and secured firmly by the fastenings of the door lining. By a special device the Protector lays over snug to the surface of the door without curling and without injuring the outside finish.

Made of the best quality black leather, neat and trim and adds to the looks of the car.

All fitted and ready to put on. Attached by anyone to any make of automobile in a few minutes.

Price 75c Each, Parcel Post, Prepaid.

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I HAVE GIVEN UP

the Goodyear solid tire contract and have the following Goodyear S. V. Truck Tires in stock. All are **First Quality** and guaranteed.

2 32x3½ 4 36x5 1 36x6

8 40x5 8 40x6

The prices on these tires will interest any truck owner.

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We Are Exclusive SELLING AGENTS for the N. F. G. CARLISLE CORD TIRE.

Dealers write for our special proposition.

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FOR FORD CARS

Dealers write us for special price.

Salesmen with Ford Cars Wanted.

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AUTO PARTS—At Your Own Prices. We can supply parts for nearly every make of car. 648 Packards, Interstate Fours, also Truck parts, GMC and other makes.

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EXPERT REPAIRING; every known Magneto and Ignition System, Starters, Motors, Generators. **Magneto Exchange and Repair Shop, 269 Halsey Street, Newark, N. J.**

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NEW YORK CITY

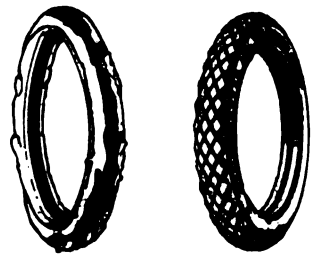
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Add to the above rates, 50c. for each additional person.

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OUR METHOD OF RETREADING IS DIFFERENT FROM OTHERS.

We use all Goodyear first quality stock and retread bands and can absolutely guarantee from
3000 to 3500 Miles.
We will replace a new tire for every one that our work does not give satisfaction.

Tires called for and delivered. We pay express charges one way on all out-of-town orders.
Price List Mailed Upon Request.

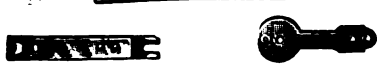
BOSTON RETREAD TIRE CO.
70 Clarendon St., Boston, Mass.

Standard Repair Parts for Magnetos, Spark Coils, Ignition Systems



Quality — Genuine PLATINUM AND TUNGSTEN POINTS — First

Graphite, Carbon and Metal Brushes



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300 West Broadway, New York
Established 1908

Atwater-Kent Sales Co., of New England

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Official
SALES AND SERVICE
For New England.

Complete stock of parts always on hand.

Write for Price List.

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are saving money for our customers all over the country. They can do as much for you. Write for catalogue and price list immediately and see the offer we are making you.

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AUTO PARTS.
50% to 90% Off List.
24 Hour Service. Unlimited Stock.
Pope-Hartford, Columbia, Reo, Overland and 200 other makes.

Motors,	$20.00 up	E. Presto Tanks,	$4.00
Magnetos,	$3.50 up	B. Presto Tanks,	$4.75
Cylinders,	$3.00 up	Bearings,	50c up
Springs,	$1.00 up	Rims,	$1.00 up

1000 Other PARTS Bargains.
If you want any part not listed here, Write Us—We Have It.

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FORD PARTS

50% TO 75% OFF LIST.
These Parts are in perfect condition and will give long service.
Kingston & Holley Carburetor....$2.50
Ford Wheels.....$1.25
Ford Tail Lamps.....$1.50
Parts for 1917 Cadillac, Stearns-Knight, Buick, rear ends for all cars. Kissel, 1914 Studebaker, Overland, model 79; Lenox, Stoddard-Dayton, Michigan, Oakland and Lozier; Gray & Davis generator and starter; Delco lighting system; high-tension Bosch and other magnetos; Stromberg and other carburetors, generators, starters, Kellogg pumps, headlights, electric and Presto, and windshields, tires, rims and tubes from 30x3 to 37x5.
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Advertise the bargains that you have to offer.

8000 Buyers Read MOTOR TRUCK.

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A few unused Herschel-Spillman heavy six-cylinder motors. 4-in. bore, 5½ in. stroke, weighing about 850 lbs., for sale at $200 each, less than half of present cost. Excellent for boat or automobile use. A big bargain.

PARKER MOTOR TRUCK CO., Milwaukee.

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BLEMISHED FIRSTS
40% TO 50%

OFF LIST PRICES
ALL STANDARD MAKES
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Magneto and Generator Exchange of N. E.
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SAVE 50%



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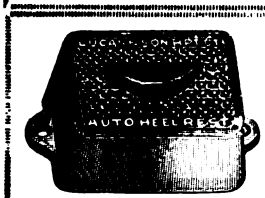
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Starting, Lighting, Ignition.

One year guarantee on repairs and installations of all makes.

Everything pertaining to Auto, Electricity, Magneto and Generator Parts. We have one of the best equipped shops in New England devoted exclusively to this work.

BOSCH, SPLITDORF, EISEMANN, DIXIE, BERLING MAGNETOS
and Parts Always in Stock.



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Made in 4 sizes, ½", 1", 1½", 2" of frosted aluminum. Sold by all dealers, or will be sent post paid 75c. Made only by
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Send for our free complete Price List covering Auto Dealers, Owners, Ford Dealers, Truck Dealers and Owners, Garages, Auto Mfrs. and etc., any state.
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AUTO SAVE 50-90% FOR 400 CARS PARTS
POPE, PACKARDS, PIERCE, BUICK, STEVENS-DURYEA, KNOX, OVERLAND, ETC.

Motors	$25.00 up	Presto Tanks	$ 4.50 up
Magnetos	4.00 "	New Spotlights	2.00 "
Carburetors	3.00 "	Generators	10.00 "
Rear Axles	15.00 "	Gears	1.00 "
Front Axles	5.00 "	Bearings	1.00 "
Cylinders	5.00 "	Radiators	10.00 "

$12 Diamond Bumpers.....$5.50

Jobbers in Bankrupt Auto Supplies.

BRIGHTMAN AUTO EXCHANGE
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A. BERGER & SON.
BUY & SELL USED AUTOMOBILES.

Come to see us and you will find largest display of used autos in our territory. Highest prices paid for your car.

Auto Parts, Rear Ends, Transmissions, Gears, Rear and Front Axles, Windshields, Magnetos, Generators, Etc., carried in stock. Our prices save you 40-60%. See us first.

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SERVICE AUTO-LITE STATION

BOSTON'S
Finest Equipped Auto Electric Repair Service

With a staff of trained electrical men we can offer auto owners expert service, coupled with promptness and personal attention to all electrical repair problems. We also repair any electrical equipment used on a motor car.
Official service and parts representative for
AUTO-LITE LIGHTING AND STARTING SYSTEMS.
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GENUINE PARTS.
All Work and Parts Guaranteed.

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REPAIR PARTS

Our new bulletin of used parts and prices now ready.
With this bulletin in your shop you can supply repair parts for all makes and models of cars listed and increase your repair business.
It Is Free. Write for It Today.

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They stop the rattle in:—
The Brake Rod Supports
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The Spark and Throttle Rods
The Steering Spindles

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BRINGS BIG RETURNS
20 Cents a Line. Seven Words to Line.

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IT'S EASY TO SAVE MONEY

It's only a question of knowing how. Save the difference between $40 and $16. The average tire that sells for about $40 would cost you about $16. Tires that you throw away or sell for junk we can retread them and you can get from 3000 to 4000 miles out of them, and some of them more. Now figure what you can save on your size. We can retread your old tire with any tread you desire for the prices quoted below. Send your tire in today and we send it back to you in three days.





Price List to Retread Your Old Tires

Size	Retread	Size	Retread
28x3	$8.00	34x4	$14.25
30x3	8.50	34x4½	17.00
30x3½	10.00	35x4	17.00
31x3½	12.00	35x4½	18.00
32x3½	11.00	35x5	21.00
31x4	12.75	36x4½	19.00
32x4	13.00	36x5	21.50
33x4	13.75	37x5	22.00

Add 10 Per Cent. Extra for Non-Skid.

We have a large stock of retreaded tires for sale. Add $1 to above list on the size you want and send your order. Mail orders given prompt attention. All orders accompanied by check or money order will be allowed 5% discount.

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Skillfully Done. Assured Satisfaction. Prompt Service.

The repair work turned out of this shop is of the highest merit—because I know how. If you have electrical and magneto troubles, no matter whether it is a **BOSCH, SPLITDORF-EISEMANN,** or any other make, I can fix them. My well-appointed plant, coupled with skilled workmen, assures you of expert magneto service. Send in your magneto. 24-hour shipment.

Rebuilt Magnetos, Platinum Parts, Generator Brushes, Bearings, Etc. Bearings, Etc.

Correspondence Invited.

The Magneto Shop

JOHN BRUNSWICK,

187 Massachusetts Ave., Boston, Mass.

Seamless Steel Tubing

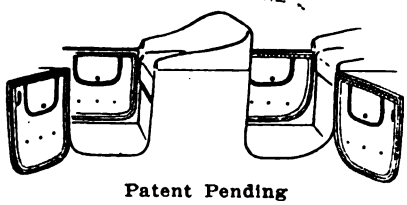
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Equip Your Ford With The CARROLL POCKETS



Patent Pending

In a few minutes you can attach to your Ford the Carroll Pocket, that much-needed pocket, the handy place to put your gloves, goggles, pliers and other small articles.

The Carroll Pocket converts the space inside the upper part of the door into a roomy pocket, and adds to the looks of the car.

Manufactured from high grade material, well made and neat in appearance.

All fitted and ready to put on. Only tools needed are your Jackknife and Hammer. Let us mail you a set.

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684 Massachusetts Ave., Arlington, Mass.

U USE USED TIRES

Established 1

GOOD FOR 1000 MILES.

We do not try to give you impossible mileage, that cannot be done. But on a 1000 mileage basis our prices are lower than any in the country.

Compare Our Prices.

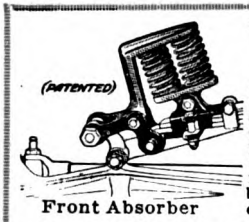
Size	Price	Size	Price
30x3	$4.50	34x4	$9.00
30x3½	$4.95	35x4½	$12.00
32x3½	$6.00	36x4½	$12.00
31x4	$8.50	35x5	$13.50
32x4	$8.50	36x5	$15.00
33x4	$8.50	37x5	$13.50

Non-Skids, 10% Higher. Tires Shipped C. O. D.

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Front Absorber

"Champion" Shock Absorbers for Ford Cars.

A new spring suspension which absorbs jar and rebound. A wonderful E-Z ride suspension. (E-Z to attach.) Guaranteed by mfrs. Exclusive sales; big profit; agents, owners, dealers. Dept. H.

Champion Shock Absorber Sales Co., Inc., Indianapolis, Ind., Mfrs.

TIRES —AND— TUBES

40% to 50%

Off List Prices.

ALL STANDARD MAKES—

GOODYEAR
GOODRICH
FIRESTONE
FISK
AJAX
UNITED STATES
HOOD
LEE, ETC.

WRITE FOR PRICE LIST.

Geo. Grow Automobile and Tire Company

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District Sales Manager WANTED

For New England Territory

By an old established Truck Company.

To a man who is well acquainted in this section and can close with the right kind of Distributors and Dealers a very advantageous contract will be offered.

In answering state experience. All correspondence strictly confidential.

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Send us $10.50 and we will mail you one. Run it 30 days. If not satisfactory return and we will refund your money.

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MOTOR
OILS



EAGLEINE OILS

are unequalled for motor lubrication, freer from carbon, economical because they protect the motor against mechanical wear, and the quantity required is comparatively small.

These are the claims of thousands of motorists,—some with years of experience, who want full value, and more who know the value of high grade lubricants, and who know when they obtain satisfaction.

EAGLEINE QUALITY IS INSURED TO YOU

A grade for every type of motor. It is sold in sealed containers.

Let us send you our new book and chart. It is free at request.

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1132 W. 37th Street

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Not to injure finest motor; to increase mileage; to increase power; to keep motor free from carbon — **or money refunded.**

Testimonials:

Hundreds of voluntary testimonials are on file from nearly every state in the Union, showing increased power, clean motors, and from 20 to 50% increased mileage.

Standard $1.00 Package Free

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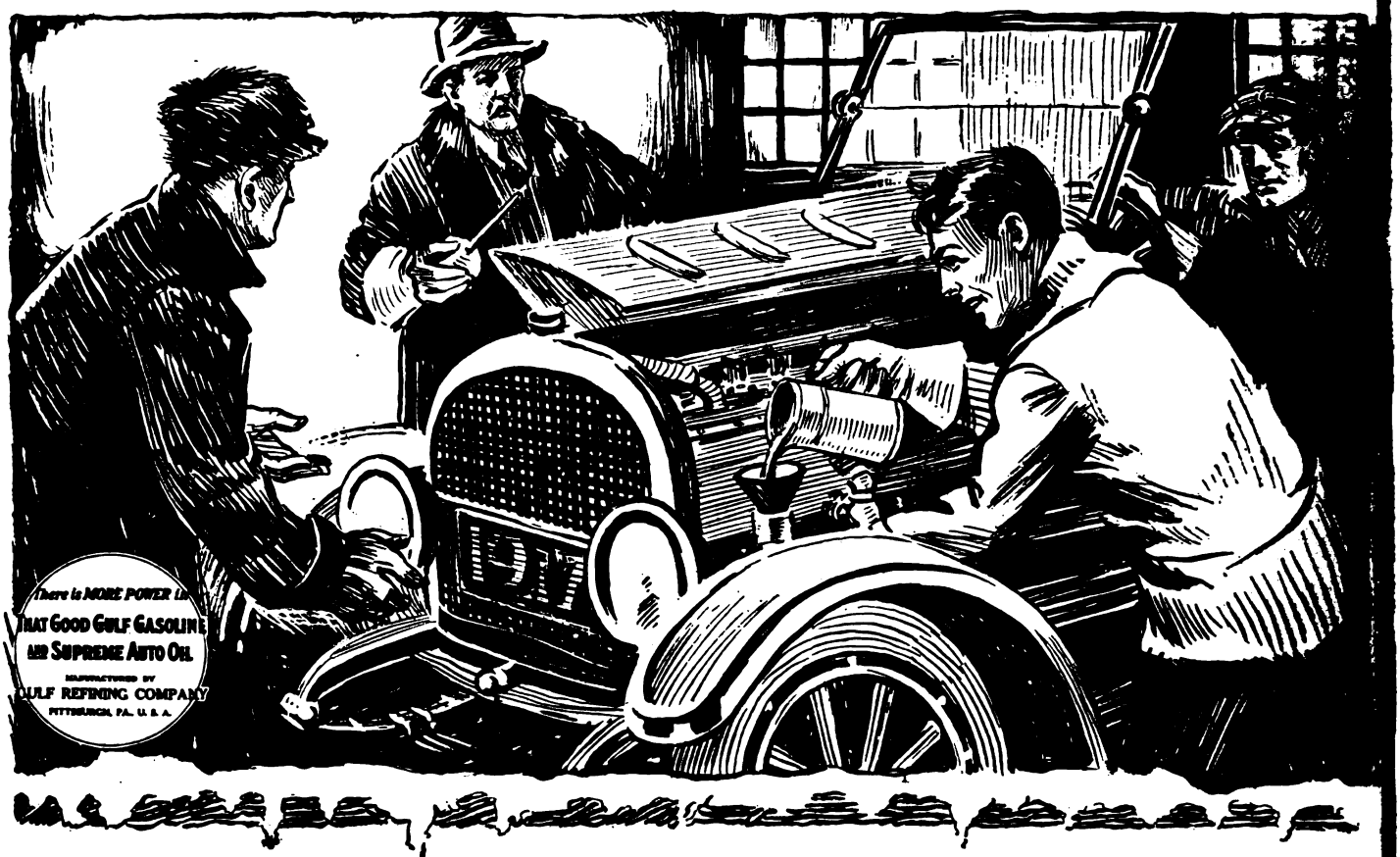
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MORMILES CO., 226-8 S. La Salle St., Chicago;
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SUPREME AUTO OIL

being manufactured from asphalt base crude, *leaves less carbon,* as it contains no paraffine to gum and stick the free carbon. At the same time it affords perfect lubrication.

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THE AUTOMOBILE JOURNAL

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SHORTAGE OF CARS HITS DEALERS THROUGHOUT ENTIRE COUNTRY AND OPTIMISM REIGNS ON EVERY SIDE

Plans for Tremendous Expansion Announced by General Motors Corporation—Sensation Caused by Rumor of Merger of G. M. C. With Ford—Great Battle for Export Trade Is Under Way With British Auto Men Prepared to Put Up Stiff Fight—New Cars Are Coming and Competition Probably Will Be Strong By Fall

DEALERS throughout the country corroborate, without reservation, the finding made by the National Association of Manufacturers in its post-armistice industrial survey that the automobile business is good. It is so good, in fact, that the trade is inclined to be gloomy; the dealers have sold about everything in the way of a car that they can get their hands upon and they grieve because they cannot make the deliveries desired.

The wail of the dealers today is for more cars. They have had their allotments, have sold them and are seeking others. Several have visited the factory cities, aiming to persuade the sales managers to let them have a few more cars. These dealers have had little luck, as they were told that the demand is great everywhere. The greatest encouragement that most of them received was that the factories are rushing production and that cars will come along faster and in greater numbers next month than they have so far this spring.

The only consolation for the dealers is that they are pretty much in the same fix, so that a customer who fails to secure his first choice of car quickly is likely to have as much trouble in his second and third choice, and, when he has made the rounds, he may wait in order to get the car he wants.

All Classes Sell Well.

It doesn't seem to make any difference what the price of the car may be, there is an equally strong demand for it. High priced cars are selling readily, medium priced cars are far behind orders and low priced cars, though produced in large quantities, are in demand in numbers that far over-reaches the production. It is harvest time for the dealer who has a car that is less well known than some others, for he is getting customers from among those who cannot wait, but must have a car right away.

The used car market also has felt the impetus and dealers are exhibiting with much satisfaction the reports of their used car departments, which show that the stocks are exceptionally low. Comparatively few used cars were turned in last autumn because owners feared that they would not be able to obtain new ones and decided to keep what they had. And the used cars that have come in this spring have been taken up readily at good prices.

GMC OPTIMISTIC.

The great confidence of the General Motors Corporation in the future of the automobile industry is indicated by its announcement that it will spend $37,398,000 for new construction projects.

Truck Market Satisfactory.

Despite the tremendous sales of trucks that were made last year, when the war activities made highway transportation essential for the prompt handling of goods, there is a surprisingly good demand for trucks this spring. There is not as much buying of the largest types of these vehicles as there was a year ago, but motorization of all sorts of businesses is making a brisk market for the medium sized and small trucks. Farmers are coming into the market more than ever before and smaller manufacturing enterprises and businesses are following the example of the larger in taking up the quick, economical motor transportation. Trucks are in better supply than the passenger cars and consequently more prompt deliveries are possible.

The motor trade does not expect present conditions to last very long and the dealers, consequently, are not relaxing their efforts to enlarge their list of prospective customers. In another month the height of the spring rush will have passed and at the same time the supply from the factories will have increased.

New Cars Coming.

New cars are coming upon the market from new concerns, and the older manufacturers are planning to put out new models, the bulk of them designed to appeal to the purchaser of the medium and low priced classes of car. By next fall, unless all present indications are misleading, there will be plenty of motor cars and trucks to sell. Dealers, knowing this to be the case, are making their plans accordingly. They are strengthening their sales forces, though at present salesmen have little to do, and they are looking ahead to the time which is surely coming in another six months, when motor cars will have to be sold under highly competitive conditions.

Meanwhile the industry is being kept stirred up by the rumors and combinations of manufacturing interests and new projects on a big scale which indicate that it is rapidly getting back into normal condition and that the tendency toward consolidation that was going on before the war is receiving renewed impetus.

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G. M. C.-Ford Merger Rumor.

Perhaps the most startling of these rumors was the one that General Motors was intending to absorb the holdings of Henry Ford in the Ford Motor Co. Control of the Ford Motor Co. would make the General Motors Corporation the biggest factor in the automobile business of the world. The rumor may have been based on an earlier report from Detroit that the G. M. C. intended to buy the Highland Park plant of the Ford company. This is the plant built up by Henry Ford, in which the parts for separate assembly, as well as completed Ford cars, have been turned out.

Mr. Ford, it is understood, plans some day to bring all his properties together at Dearborn, where the tractor plant is, and to turn out there all the Henry Ford & Son products. If G. M. C. does buy out Henry Ford it will explain Mr. Ford's recent announcement that he intended to get out of the Ford Motor Co. and build a $250 car under the Fordson name.

Report has also connected General Motors with Maxwell and Chalmers. If G. M. C. buys out all the companies that rumor says it will, the main part of the industry will eventually be in few hands. This is possibly the underlying idea of the big combination which W. C. Durant, president of General Motors, started years ago.

G. M. C. Expansion.

That the G. M. C. has unlimited optimism in the future of the automotive industry was indicated by its recent announcement that it had authorized for plant extensions and for new construction projects, to be completed during the present fiscal year, expenditures of $37,398,000. The distribution of the vast expenditures will be as follows:

Detroit, $12.650,000; Flint, Mich., $6,715,000; Pontiac, $2,150,000; Lansing, Mich., $2,450,000; Saginaw, Mich., $2,427,000; Toledo, O., $543,000; St. Louis, Mo., $4,135,000; Bristol, Conn., $1,028,000; Janesville, Wis., $4,500,000; Muncie, Ind., $800,000.

This is the General Motor Corporation's decisive answer to nervous folk in the world of industry and finance who have "been waiting developments" of post-war conditions before mapping out their industrial and financial plans for the ensuing year.

"Everybody has been waiting to see what the other fellow was going to do," said W. C. Durant, president and general manager of the G. M. C., as he made the announcement. "This is what General Motors is going to do. The investment of these large amounts again emphasizes and confirms its judgment in the underlying stability of the country, and in the soundness of the automobile industry."

Allotment to Detroit.

In the $12,650,000 allotment to Detroit is included an item of more than $5,000,000 for a 15-story general office building with a research laboratory, four stories, in the rear. Mr. Durant authorized announcement that the G. M. C. would also expend about $6,000,000 in Walkerville, Ont.

Detroit's share comprises a new plant for the Cadillac Motor Car Co. division, sales and service building for the Cadillac; a differential gear and transmission plant, extension to the Central Forge Co. and the Northway Motor and Manufacturing plant and the office building and research laboratory. The office building will contain an auditorium seating approximately 1000.

Walter P. Chrysler, president and general manager of the Buick Motor Car Co., has been promoted to be vice president in charge of all General Motors operations and assistant to the president. The strong central operating organization, headed by Mr. Chrysler, will direct in a general way the carrying out of the policies of the corporation. Mr. Chrysler will continue as president of the Buick company. He will be succeeded as general manager of the Buick company by Harry H. Bassett, assistant general manager of the plant for several years.

Plan Big Extensions.

Big extensions to the Buick and Chevrolet plants and the erection of 1000 model homes are planned for Flint. The rapidly growing Oakland plant at Pontiac will be enlarged and new homes erected there. In addition to the erection of a new axle plant at Lansing an extension will be made to the Olds Motor Works. At Saginaw there will be important foundry extensions and a new heating and power plant.

In St. Louis there is an interesting development. The Buick company, heretofore confined to Flint, is to have a new assembling plant in accordance with plans which call for an output in 1920 or 1921 of 300,000 cars. Chevrolet is to have another assembling plant, and a big wood working plant for the G. M. C. organization is to be erected in St. Louis, the natural center on account of its accessibility to the lumber district.

Under Mr. Chrysler's management the Buick output has been expanded from 36,000 cars in 1913 to 140,000 cars per annum. It is understood that the new arrangements involve no material change in the policy of the independent management of the General Motors extraordinary development.

The G. M. C. and practically all of the other motor car companies are paying strict attention to foreign trade opportunities. Henry Ford is also going after world trade. Robert S. Neely, manager of the foreign department of the Ford Motor Co., has announced that the company was committed to the policy of developing export trade to a degree limited only to the output of its factories. The production of the Detroit plants will be swelled to a new high mark of 4000 cars a day, within the next few weeks, topping the previous record by 500.

British Competition.

Henry Ford has been in conference with Sir Percival Perry, managing director of the Ford Motor Co., Ltd., at Detroit, in regard to the question of whether the export trade will be handled from New York direct or from the United Kingdom. The strides that the Ford company is making in the matter of capturing the export trade may be indicated somewhat by the statement that sales in Argentine increased 1000 per cent. during the last year.

British manufacturers are beginning to fight for their share of future business. In view of the fact that Australia and New Zealand have recently been large buyers of American cars, the exports to Australia for 1918 being 3826 passenger automobiles and 1418 to New Zealand, it may be interesting to American manufacturers to note that the English Department of Overseas Trade and the Association of British Motor and Allied Manufacturers decided to send an investigator to Australia, New Zealand, India and the Far East to ascertain the conditions and prospects in the territories for the sale of British motor vehicles, their parts and accessories.

Announcement that all blacklists are to be abandoned has cheered the export men in this country. By some it is argued that this is simply the forerunner of a complete suspension of all embargoes on enemy countries. By the stock market the action has been accepted as one more move toward that oft-spoken-of and never definitely defined period commonly referred to as "normal."

Maxwell-Chalmers Merger.

Automobile makers were greatly interested in the announcement that a consolidation of the Maxwell Motor Car Co. and the Chalmers Motor Corporation is being considered by the board of directors of the two companies. Elton Parks, a director of the Maxwell company, has issued this statement:

"Rumor is current and has been given publicity in the press, that the Maxwell-Chalmers companies are to combine their interests into a new company to be formed for that purpose. It is true that the respective boards of directors of the companies view favorably a combination of their interests and those in control of affairs of both companies have been working for that end, but the matter had not yet progressed sufficiently to make announcement of the details of the plan, which in the last analysis must be referred to the respective stockholders and accepted by them before it can become operative."

Detroit Needs Labor.

The vast production going on in the automobile plants is reflected by a call sent out by the Board of Commerce of Detroit for demobilized soldiers to go to that city. With the large automobile manufacturing concerns advertising in the larger eastern cities for labor to man their plants in Detroit, Pontiac and elsewhere in Michigan, and other industries combing the city for common laborers, the labor situation is serious.

It is impossible to get men enough to supply the demand in Detroit. Flint, where the General Motors Co. has made plans for building 1000 homes for working men, is declared to be particularly short of labor, and all classes of workers are wanted at the Chevrolet plant.

Some weeks ago the Board of Commerce sent out notices warning returned soldiers of a scarcity of jobs in Detroit. The conditions are now reversed.

More than 15,000 Willys Overland Co. employees have received checks aggregating $400,000.

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Seize Fake Army Officer "Selling" U. S. War Cars

UNCLE SAM has run down the "agent" who has been spreading the report that the government proposed to flood the market with cars and trucks bought for war service. This man, dressed as an army officer, and driving a high-powered automobile, went from city to city, telling dealers that the War Department had authorized him to take orders for machines that had been purchased for war use.

His scheme was to get money from the dealers as part payment on cars he promised would be delivered to them, and it is said that he succeeded in getting many thousands of dollars in this way. He was recently arrested at Danbury, Conn., by Army Intelligence Department detectives.

The sleuths evidently regarded him as very dangerous, not only through the harm he was doing the automobile trade in scattering the false rumors, but also physically, as they made the arrest with drawn pistols. He had just come into Danbury and was about to alight in front of a hotel when arrested. A young woman who accompanied him was questioned, but not held.

The Federal officials say they have traced to his operations many of the reports that the government was to sell its cars to the public. These reports, despite repeated denial by the government, have been a thorn in the sides of automobile dealers in all parts of the country.

Many persons who are able to buy a car have been deterred from placing their orders because of expectation that they would be able to buy government automobiles at bargain rates.

In Automobile Business.

The man arrested in Danbury was dressed in the uniform of a lieutenant colonel of the United States Army. He is 31 years old and lives in Jersey City, where he was in the automobile business prior to his enlistment in the army. He enlisted in the Quartermaster Corps as a private.

Soon after he donned the uniform complaints began to reach the police about his having swindled customers by taking old automobiles in return for new cars, which he never delivered. He was indicted, but when search was made for him in the army it was found that he had been transferred to the Motor Transport Corps and had been promoted to the rank of major.

He was arrested in a camp in the South, returned to Jersey City and lodged in his uniform in the Hudson county jail. He remained there for several weeks, but was released eventually in $5000 bail. When his case was called in the Court of Common Pleas he had disappeared.

He was arrested in Danbury as a deserter from the army and on an indictment in Jersey City charging him with defrauding 30 prominent men of that city of sums aggregating $30,000. But the government was more anxious to apprehend him because he was believed to be the alleged army officer who has been going about the country in an automobile informing dealers that the War Department had commissioned him to dispose of several thousand automobiles purchased for the use of the army during hostilities.

Gets Publicity.

They explained that the alleged officer spreading that report had succeeded in obtaining considerable publicity of the fact in newspapers in various parts of the country, and that he also had sold many automobiles, which later were discovered to have been stolen from other cities.

The belief of the public in the false reports of the sale of army cars is indicated by the following article published in a Boston newspaper:

"Capt. James H. Brown, motor transport chief for this army district, wants the public to know that the army has no autos for sale. He says that every minute of the day he gets letters, telephone calls or has visitors looking for a bargain in autos, and many insist, even after he tells them none are for sale, that he really has some. If the army disposes of any of the machines now in use it will be, he said, by the regular method



of advertising, inspection and sealed bids."

In addition to the requests that have come to the army officers located in the various districts throughout the country, a vast number have reached Washington. In fact, there has been a veritable flood of these to the War Department officials there.

No. U. S. Cars Sold.

So far no such property has been sold. If any is sold it will be surplus stock for which there is no further public use. This cannot be known until inventories and government department requisitions are completed. It is a case of the government eating its own apple, of which it seems likely "there ain't going to be no core." What is left will be offered first to original manufacturers for disposal through the automobile trade in the hope that the government will receive a fair price without disrupting the industry. This will be disappointing news to the thousands of patriots who are offering to pay as much as 20 per cent. or less of the value for the best makes "if in good order."

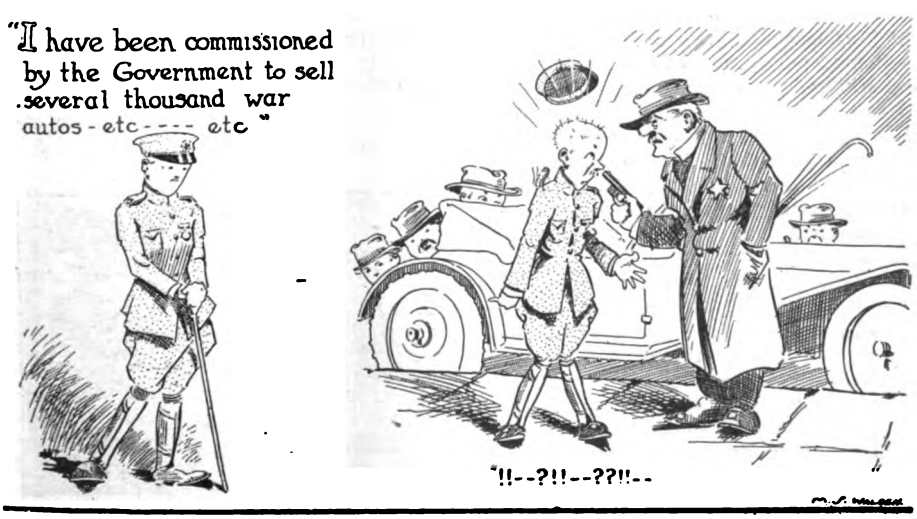
It is to avoid such scandals as attended private disposal of property to favored buyers after the Civil and Spanish wars that extraordinary care is now taken in marketing the unprecedented surplus stocks of all kinds in the hands of the War Department. And another danger has to be guarded against. These stocks in many lines—such as machinery, tools, textiles, building materials, chemicals, raw products and various other things—are so great that to throw them on the market would seriously depress prices and disturb trade.

Popular Interest.

Motor vehicles bought by the government amounted to a comparatively insignificant item in the bill of war purchases. Yet popular interest in the disposal of these vehicles is immensely keener than in all the other things combined.

One automobile company wrote:

"Just at this moment a Philadelphia gentleman claims he will show us 1450 new cars (mentioning the make) which



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belong to the government which are for sale and which can be bought for $650 each, and 220 used cars (same make) which can be bought for $325 each. We assured him we would purchase the lot if title can be shown. While we do not expect that he will be able to show us these cars we would like, as far as possible, to kill off this character of news, and whatever you could say would be appreciated."

This was what the director of sales could and did say: "Relative to any serviceable automobiles or motor trucks, no sales of such property have as yet been authorized. The inventories are incomplete, and the requirements of motor transportation equipment of the army are being refigured and restandardized. At such time as gross surplus of this property can be determined it will be necessary to transfer such portion of the surplus to other government departments as can use them advantageously. Then the manufacturers will be offered an opportunity to take back their product at a fair price and market it through regular trade channels. Such net surplus as cannot be disposed of in this manner will be sold publicly under competitive conditions after giving the matter publicity through the press.

"Rumors have been circulated to the effect that the War Department has for sale large numbers of new automobiles and motorcycles at various camps throughout the country. There is no foundation whatever for these reports. It would be greatly appreciated if you would notify this office of the name of the gentleman who is disseminating such malinformation, giving a description of him and any other information as to his whereabouts. Such cooperation on your part might be the means of bringing about an abatement of such rumors, which are detrimental to the automobile trade."

To a similar inquiry from the Far West the answer was, "No such truck was ever bought by the government." From down South came the information that "we understand that the government has some cars already crated to ship to France. Let us know the price at once." Another query was, "Are you going to dispose of any cars in Chicago? We want one." An eastern firm heard that 200 cars were for sale at $350 each, and offered to take the lot. "We learn," said a man of the Middle West, "that you are disposing of machines of the touring car type. Advise me of the name of the party with whom to take this matter up."

New York brokers wrote for lists of cars and trucks. One letter said, "I want one for funeral work."

No car that will run has been sold or will be until all the other government department needs have been satisfied. As soon as the various camps, stations and bureaus of the War Department complete their counts of motor vehicles for which they have no further use, and the director of sales can tell what can be used by other branches of the public service, he will sell the net surplus in the manner laid down and in no other And the outlook is that there will not be nearly enough to go around.

Willys-Overland to Increase Its Output

John N. Willys, president of the Willys-Overland Co., in his annual report to the stockholders, announces a new manufacturing plan which calls for a production expansion in Toledo to 175,000 cars during 1919, an increase of 25 per cent. over the company's best year. He says that



John N. Willys.

in proportion to the supply the demand for cars was probably never greater than now, and that the outlook for the farm and tractor industries was never brighter.

The 1918 business was 10 per cent. greater than that in 1917, the best previous year in the company's history. While the gross profits for 1918 totaled $11,510,645, necessary deduction for reserves for depreciation, replacement of tools, equipment, etc., and obsolete parts and materials, leaves a net income of $5,536,254.

All passenger car production ceased Nov. 1, 1918. On the day that the armistice was signed the company had on hand $75,000,000 of government business, of which 42 per cent. was completed. The company had determined to shape its 1918 program to the winning of the war and a wide variety of government contracts was accepted. In the production of gun carriages, alone, the Toledo plant reached a daily production greater than the combined gun carriage works in France.

"By Jan. 2," Mr. Willys reports, "or within less than 50 days after the stop work instructions on war contracts, we were again turning out automobiles and by Jan. 31 were shipping 315 cars daily. At the present time, 425 cars are being turned out daily in accordance with a schedule calling for a steady increase to 1000 cars daily in August."

In September, 1918, the Willys-Overland company acquired control of the Moline Plow Co. The output there in agricultural implements and farm tractors will be doubled and in 1920 doubled again. The purchase was made, Mr. Willys writes, because the Willys-Overland company anticipated, regardless of war or peace," an almost unlimited demand for tractors in an age of power farming."

NO NEW FORD FOR AT LEAST TWO YEARS.

Edsel B. Ford, president of the Ford Motor Car Co., Detroit, in a letter to Ford agents, says:

"On account of recent rumors circulating over the country concerning a new car to be manufactured by Henry Ford, we believe it advisable to inform our dealers generally in order that you may intelligently and uniformly answer all inquiries.

"In the first place, a large majority of the reports afloat are distorted. A new car may be manufactured, but as to when it will be manufactured we are not in a position to say, except that we do know a new car could not possibly be designed, tested out, manufactured and marketed in quantities under two or three years."

BRISCOE GETTING BACK TO PEACE PRODUCTION.

Production at the Briscoe plants at Jackson, Mich., has been increased to 75 cars a day, and it is expected that the 100 mark will be passed this month. Every effort is being made to get back on the production basis that was in force before the war orders came.

DETROIT CRANKSTAFT AIR PUMP VERY HANDY.

The Detroit Crankshaft Tire Pump was patented to save the car as well as the tires. It solves one of the most troublesome problems the owner ever had to deal with. It gives "free air" at an instant's notice, generated under correct conditions without jar on transmission and delicate parts of the car. It enables the owner to keep tires up to proper pressure without any trouble on his part by simply sliding the pump onto the crankshaft. It is made by the Detroit Accessories Corporation, Detroit.

This accessory is bound to have an unusually large sale.



Detroit Crankshaft Air Pump.

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INDIANAPOLIS ATTRACTS SPEED KINGS



Ralph De Palma.







Dario Resta.

THE vitality of the motor car industry and its ability to assimilate war handicaps and come back stronger than ever, is strikingly demonstrated in the interest which race drivers and manufacturers alike, are manifesting in the 500-mile International Sweepstakes to be held on the Indianapolis Motor Speedway, May 31.

Among all industries, that of the automobile was hardest hit by the war. Not only was it denied the privilege of keeping up even a small production, but its man power was depleted almost completely and its factories commandeered down to the last lathe and drill press. All of this, however, was agreeable to the automobile men, for no one can question the whole-hearted devotion and patriotism of the men of motordom as revealed under fire.

The big race scheduled for Indianapolis will, according to present conditions, be the main event in the racing world this season. With no race since 1915, there is no question but what the coming revival of this big automobile classic will see the largest crowd in attendance that has ever attended a race in America.

The purse offered—$50,000—is attractive enough to interest nearly all of the speed kings of the world. In addition to such well known drivers as De Palma, Chevrolet, Resta, Mulford, Hearne, Pullen, Durant, Cooper, Milton, Taylor and others, a number of European drivers are sure to be entered. Jules Goux, who won in 1913, will be a contender for the 1919 honors. The famous racer has served with distinction in the French army and is now ready to try to add to his laurels by winning the Indianapolis event.

Durant to Compete.

Considerable interest centers in the entry of Clifford Durant, because of his victory in the 250-mile San Monica road race March 15 in a Chevrolet Special car. He is a son of W. C. Durant, the head of the General Motors Co., and is manager of the Chevrolet plant at Oakland, Cal.

Ralph De Palma will drive the 12-cylinder Packard that he has used with great success on the speedways. This will be his sixth race at Indianapolis and the third time that he has manned an American made car. In the 1911 event he drove a Simplex to sixth place, in 1913 his Mercer failed early in the race, his only starts with Yankee racers. In the 1912 race his Mercedes faltered with two laps to go to victory, in 1914 his Mercedes did not start, being damaged in qualifying, while in 1915 he scored a victory in the last 500-mile with the Grand Prix Mercedes.

Roscoe Searles, winner of the two 150-mile races of the season on the Ascot Park Speedway, Los Angeles, will not drive his Roamer at Indianapolis. Searles made a hit with Barney Oldfield, who witnessed the last 15-mile race. Oldfield has always been a tire crank. Searles started the last race using retreaded tires and won from a fast field, averaging 71 miles an hour with three stops. Oldfield decided that with good tires and a fast car Searles could beat the crack drivers of the world on a course like the Indianapolis Speedway.

Drives for Oldfield.

Oldfield, who was recently reinstated by the A. A. A. Contest Board, picked Searles to drive his "Golden Submarine" in the $50,000 race, and made a deal whereby Searles will drive the car the entire season.

Dario Resta, who won the only official championship ever awarded in the history of the speed sport in America, will drive a foreign car, but not the French Peugeot that has always carried him to victory. Resta's mount will be the same English Sunbeam that the late Joe Christiaens was to have piloted.

Louis Chevrolet, who has entered a car without a name in the sweepstakes, has the distinction of being one of the few drivers to win a big race on "three legs," or three cylinders. Back in 1909 when Louie was the star of the Buick team, he won the Crown Point, Ind., race for the Cope cup. From the start Chevrolet drove like a wild man and the fans picked him to win. He had a long lead on the field when he was forced into the pits by the smashing of one piston. Nelson, his mechanic, disconnected the rod for the dead cylinder from the crankshaft and persuaded Chevrolet to resume the race. The Franco-Swiss, though unable to approach his average early in the race, had enough margin to go out and win.

Eddie Hearne will drive a Chevrolet Special. Since the Santa Monica race he has overhauled the racer and claims to have put about five miles an hour more under the bonnet.

Speedway History.

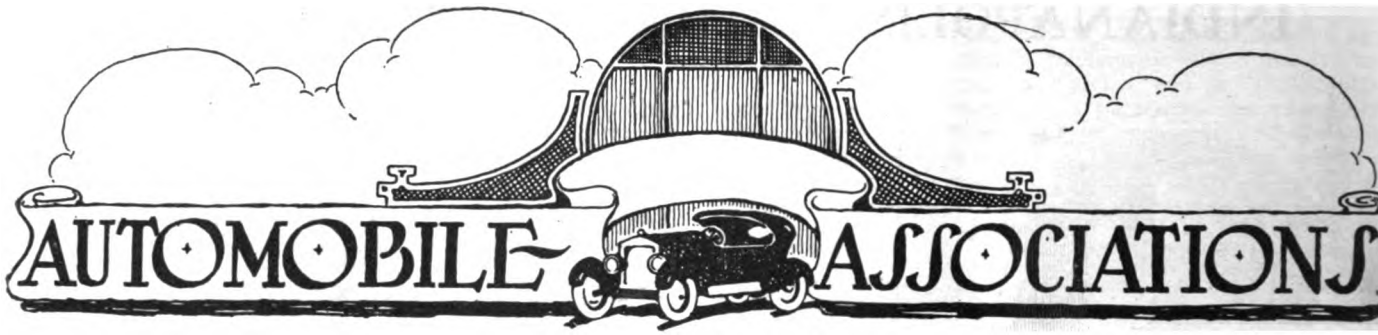
Speedway racing was first introduced in America in 1909 by the promotion of the Indianapolis Speedway. The idea originated with Carl G. Fisher, who enlisted as his associates in the venture J. A. Allison, A. C. Newby and F. H. Wheeler, all of Indianapolis. The original track was completed in August, 1909, and the first racing events were held Aug. 19, 20 and 21.

The track was of taroid construction and failed to stand the wear of the speeding race cars. Due to the tremendous speed, great ruts were worn at the turns, which caused many disastrous accidents. The investment of the speedway up to that time had been approximately $500,000.

When the coming Liberty Sweepstakes are held there will be some familiar faces absent. George Boillot, the automobile idol of France, who in 1914 raced as a teammate with Jules Goux, died for France when he was shot through the heart by a Hun machine gun bullet while fighting 10,000 feet in the air. Josef Christiaens, a favorite of Albert, King of the Belgians, died in an accident at Wolverhampton when testing out a car for the Liberty Sweepstakes.

Captain Eddie Rickenbacher, the ace of American aviators, has been urged to compete, but he announced that he had retired from the racing game.

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A. A. A.

The American Automobile Association announces that many national organizations interested in one way or another in highways improvement will support in the next Congress what is now known as the Townsend bill. This is evident from the numerous inquiries received by the A. A. A. from all parts of the country. These letters find their way to the association's main headquarters because of the cooperation of this country wide organization of car owners with the American Association of State Highway officials in the passage of the Federal Aid Road Act, as a result of which the Federal government is to spend $275,000,000 in the next 2½ years, with a like amount contributed by the several states.

Director of Roads J. E. Pennybacker, who recently resigned as chief of management of the United States Bureau of Public Roads to devote his energies to A. A. A. highways work, thus outlines the support that will undoubtedly accumulate behind the bill which will call for a Federal system of interstate highways:

"While it is to be expected that the 6,000,000 motor car owners in an organized form should contend most vigorously for a maximum Federal concern in roads progress, there are other national associations the members of which have an equally great interest in highways improvement. For instance, the National Grange would approach the subject from the transportation viewpoint, since it profits the farmer little to raise crops which cannot be economically delivered to market.

"The United States Chamber of Commerce, with its powerful local chambers and thousands of individual members all over the country, gives evidence of its interest in the subject by adding to its committees one which will devote its activities to highways betterment. The American Association of State Highway Officials, composed of the respective state highway departments and the Federal Bureau of Public Roads, is concerned because these are the road building organizations upon which the various commonwealths depend for the construction and upkeep of state highways and for coordinating these state systems with a national policy to meet interstate needs.

"There has recently been a get-together movement of the national bodies identified with memorial and interstate highways resulting in the formation of the Associated Highways of America. These coordinating agencies will undoubedly sit in when the national bodies seek to smooth out their differences at a common table, so to speak, to the end that Congress may know just where the thoughtful men of America stand on this fundamental question of highway improvement.

"It is not propaganda, primarily, but counsel which is needed at this stage. It is the time for getting down to brass tacks, with each organization speaking as a whole for all the interests of all its constituents and in a spirit of coordinating their interests with those of other bodies involved."

A. C. A. Election

The Automobile Club of Amreica, at its 20th annual election of officers, elected the following among the directors for the term expiring 1922: Henry B. Anderson, James C. Brady, Coleman du Pont, Alexander J. Hemphill, Hamilton F. Kean, Percy A. Rockefeller and James A. Stillman. None of the organizers or the incorporators of the A. C. A. (1899) are now members of the board of directors. Colegate Hoyt and Dave H. Morris are probably the oldest members now on the board.

CLUB PLANS DINNER.

The Automobile Club of Hudson County, N. J., will have a beefsteak dinner April 29. The large number of new members recently admitted to the club have been asked to come forward for the dinner to get acquainted with the older members, whose business obligations have kept them away from the regular monthly meetings. The committee arranging for the event consists of Everett W. Cox, Edwin S. Purdy and A. M. Henry.

TOURING INFORMATION.

In preparation for the opening of the touring bureaus of the clubs in the New York State Motor Federation, Lester Bush of Rome, chairman of the Touring Committee of the Federation, has made plans to gather road information covering the roads in New York state, as well as the eastern states.

He will compile the same and send it to the clubs in the federation so that their touring bureau officials will have the very latest data to supply to members and tourists who will go to New York state this year.

Massachusetts

The Runs and Tours Committee of the Bay State Automobile Association has made the following report to the board of governors:

"In accordance with instructions the Runs and Tours Committee operated a glass collection truck during the week of March 15 to 22. The purpose of this truck was to bring to the public attention the enormous waste caused by the careless scattering of glass on the public streets.

"The campaign attracted a great deal of attention and secured a large amount of publicity for your association. During the week there was collected approximately 200 pounds of glass of various kinds, which collection contained glass used for practically every known purpose. There was, however, a very large proportion of milk bottles collected .

"The glass is now being exhibited in the Diamond Rubber building, on Boylston street, and has attracted a great deal of attention. The results attained were reported to the Boston police department and resulted in a two-page order being read to every police officer in the department and there have since been numerous prosecutions.

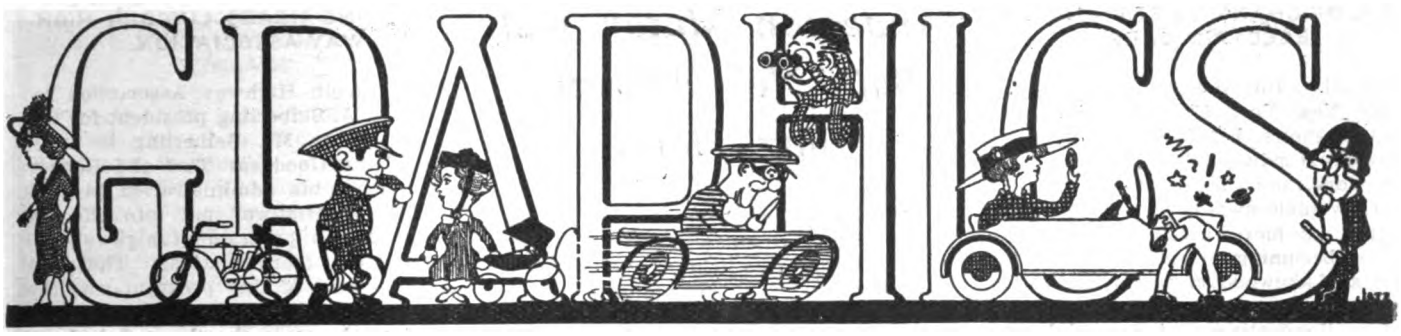
"In regard to the publicity which the Bay State Automobile Association received through this campaign, would say that in each of the Boston papers there was a daily news story on this subject, also the International News Service made a film of the truck, which film will appear in one of their early releases and will give the complete story, showing the truck in operation and illustrating the damage caused to tires by glass.

"The total expense to the club for this campaign amounted to $74.

"The chairman of your committee wishes to take this opportunity to suggest that Mr. Harry Dunn of the Boston Oldsmobile Co. receive an official vote of thanks from the club for his kindness in donating an Oldsmobile truck and driver for the week of the campaign, also to thank Mr. J. L. Hamilton for the use of his office and telephone, by means of which telephone the calls reporting glass in different sections of the city were received, and Mr. J. J. McNamara for advice and counsel in regard to publicity matters.

"In conclusion, your committee is of the opinion that the association should keep alive in the minds of the public the damage caused by promiscuous scattering of glass."

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After drawing $500 from a bank for the weekly pay roll, Miss Stella McCormick, cashier for the Van Blerck Motor Co., was about to enter the offices of the company, on the fourth floor of the Hudson Terminal building, in New York City, when an unidentified youth struck her on the wrist. The envelope containing the money dropped to the floor and the lad picked it up and ran. Miss McCormick started down the hall after him, screaming "Stop Thief!" The thief darted down a stairway and escaped by opening an emergency exit door.

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Judge Burke of the Municipal Court in Boston, when informed that a prisoner before him had been operating an automobile for six years without registering and obtaining a license, told the man



that he had been a pirate on the highways all that time. The only excuse offered for this persistent evasion of the law was that the defendant had simply been careless.

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"Don't work your truck to death," is the advice being given manufacturers. They are reminded that when they had horses they were careful of them, and now that they have trucks they should be careful of them, too, for the sake of economy.

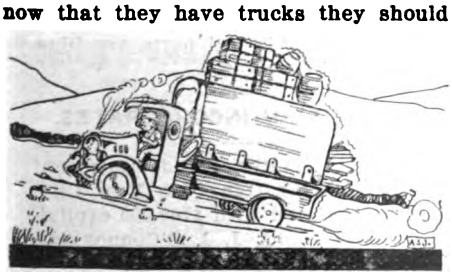
A big motor truck laden with twice as much of a metal product as the vehicle should have carried toiled up the hillside.

"It's the only truck the mill has," grinned the driver as he stopped at the top of the hill.

"Why only one?" he was asked. "That's a pretty big mill you have down there."

"Well, we're going to," was the reply. "At least the old man was saying he guessed next spring he'd have a couple of more trucks."

It will be a wonder if by that time the galant truck will not have been worked to death.



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The speed maniacs have tried the patience of the public, caused exasperation among the authorities in charge of enforcing the law and brought opprobrium upon their heads from the pens of the editors, but no such drastic recommendation for eliminating this class of nuisance has come to light, as has been suggested by a writer in the Woburn Times (Mass.). Whether or not this gentleman was ever struck by one of the speeders is not known, but if his experience with them were to be judged from the vindictiveness of his idea as to how they should be treated, he not only must have been hit, but rolled over a number of times, as he suggests that "speeders should be jailed without bail. It is just such men as these that should be dragged into court at the noose end of a rope attached to the police car and then given a chance to break rock for a few years."

Of course such harsh treatment for the speeder is really out of the question, but sometimes it seems that it would be justified punishment, as these maniacs know it is against public policy, the law and their own interest, yet they persist in the evil practise. But then it must be remembered that speed maniacs are necessarily irresponsible people, and as such, a pace of 50 to 80 miles an hour, if necessary to gratify their mania, would be pursued even in the face of a possible penalty of a little thing like $100 fine or a few days in jail.



A pretty young woman is accused of being Chicago's first woman automobile thief. She is 25 years old and said she lived in Chicago. She was arrested on the charge of stealing the $7000 auto of Sterling Morton. The young woman denied that she had stolen the car, declaring that she had bought it for $800. She was held for the grand jury.

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Mr. McChesney gets exceedingly lonesome in a tank town, as any traveling salesman will tell you. One of them moored in a place on the Connecticut circuit a few evenings since hit on a rather



unusual idea to break the spell. He dropped in at the police station, coaxed the chief into giving him rides around town in the motor patrol and imagined it was Saturday night.

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"It didn't function," was the defense set forth by Harrison Washington, colored, in the Circuit Court at Springfield, Ill., where he was defendant in a replevin suit brought by J. F. Tomlinson, who claimed Washington failed to keep up installment payments on an automobile. The colored man insisted that the automobile did not come up to the representations.



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CHAIN OF CHARGING STATIONS FOR ELECTRIC CARS.

The 1919 automobile hand book issued by the New York Electric Vehicle Association shows that a chain of charging stations, extending in all directions from New York, now make it possible for electric vehicle owners to reach points a hundred or more miles away without fear of becoming stranded. A battery boost at Lakewood makes Atlantic City a fine one day run; boosting stations in Eastern Connecticut and Central Massachusetts bring Boston within reach of the electric car; stations at New Brunswick and Trenton make the Philadelphia run easy, and south of Philadelphia there are charging stations all the way to Washington.

Electric vehicle routes from New York to Philadelphia, to Atlantic City, to Easton, Pa., to Ellenville in the foothills of the Catskill Mountains, to Pittsfield, Mass., and to New Haven, Conn., are described in the hand book. Included is a complete list of charging stations in and near New York, with particulars as to capacity and rates.

The booklet is designed to aid, not only the electric vehicle tourist, but the operator of electric commercial vehicles whose deliveries are in the suburbs. The book will be sent free to any one, upon request to the association, Irving Place and 15th street, New York City.

ANDERSON ELECTRIC CAR CO. PLANS EXPANSION.

Returning from a trip to Detroit, E. Y. Stimpson, Boston dealer in the Detroit electric car, waxed enthusiastic over the future for this car in New England. He said that to meet the requirements of post-war business conditions, several changes have been made in the Anderson Electric Car Co. Although additions were made to both the Detroit and Cleveland plants of the company, to handle ambulance body and other government contracts, a survey of business future disclosed the necessity of more space, increased capital and a rearrangement of the manufacturing facilities for Detroit electric cars, automobile bodies and electrical industrial trucks.

It has been decided to segregate the manufacture of industrial trucks and motors for passenger cars in the Cleveland plant, and devote the present Detroit factory exclusively to body building, painting, trimming and fender production. The electric motor car department will be moved to a new factory where the chassis will be built and cars completed and shipped.

Administration of the Cleveland factory and the body plant will be under the direction of the Anderson Electric Car Co. The electric motor car business was to be incorporated under the trade name of the Detroit Electric Car Co.

CHARTERED IN CONNECTICUT.

The N. E. Skinner Co., New Haven, Conn., to deal in automobiles, has been chartered in Connecticut with $10,000 capital.

Anderson Motor will Build New Assembling Plant.

The Anderson Motor Co., Rock Hill, S. C., has started work on its new assembling plant, which will have 180 feet frontage with two wings, one 300 feet long, the other 250. Suitable railway facilities have been established to assure rapid loading and unloading of freight cars. Each wing has a 14-foot platform to facilitate handling incoming and outgoing materials.

The building is being constructed by the Truscon Steel Co., Youngstown, O., and will be fireproof construction throughout. It will be of steel and glass. This building will be completed May 1 and will allow the company to double its present production.

To take care of this increase in production the company has recently increased its capitalization to $1,500,000, which amount will soon be paid into the treasury. The sales organization has been enlarged and there are now seven district sales representatives throughout the country.

Since the first of the year the company has secured distributors in North Carolina, Georgia, Arizona, Florida, Colorado, Nebraska, Tennessee, Illinois, Ohio, Pennsylvania and California. Indications are considered very favorable for closing the entire country in the new future.

WETMORE-SAVAGE ABSORBS ACCESSORY BRANCH.

The entire business of the Motor Car Equipment Co.'s Boston branch, 180 Massachusetts avenue, one of the leading automobile accessory jobbers of New England, has been purchased outright by the Wetmore-Savage Co., wholesale electrical supplies, 76 Pearl street, Boston. The Wetmore-Savage Co. took over practically intact the entire Motor Car Equipment Co. organization.

To signalize this event the former motor car organization met at the American house for a farewell dinner, which took the form of a "memorial service."

The guests were V. C. Bruce, Wetmore, Hanson Savage, Elmer Littlefield, J. C. Lane, A. M. Moody, John Will, Charles Oliver, R. P. Greene, all of the Wetmore-Savage company. Menus took the form of a black-bordered memorial pamphlet with a four-page poem written by H. T. Watkins, formerly of the Motor Car Equipment Co. of New York.

DEAF MUTES "HEAR" ADDRESS BY GOODYEAR OFFICIAL.

An important group of rubber workers in Akron, O., is the colony of deaf mutes employed in the numerous rubber factories of that city. At their second annual dinner recently, with 250 mutes present, President F. A. Seiberling of the Goodyear Tire and Rubber Co. spoke, his remarks being interpreted in the sign language as he proceeded.

SEIBERLING HEADS LINCOLN HIGHWAY ASSOCIATION.

The Lincoln Highway Association re-elected F. A. Seiberling president for the current year. Mr. Seiberling is president of the Goodyear Tire and Rubber Co. During his administration in 1918 the Lincoln Highway put into effect a comprehensive program of highway improvement in many sections. The most elaborate part of this program was the construction of an 18-mile stretch of gravel road across the Great Salt Lake Desert, in Utah, cutting off 50 miles from the former route between Salt Lake City and Ely, Nev. This section is known as the "Goodyear" section. Its construction was financed both by Mr. Seiberling, personally, and by the Goodyear Tire and Rubber Co.

RHODE ISLAND "COP" PATROLS TOWN WITH AUTO.

East Providence, R. I., has established an automobile covered police beat. Communities have made use of the motorcycle in patroling sparsely settled sections, but East Providence has provided its department with a touring car for this work. It will be used for night duty and the patrolman assigned to it will cover the rural districts at night.

During the first night the automobile was on the job it covered 62 miles and the policeman chauffeur pulled in 44 signals from the boxes on his beat. The automobile policeman, in addition to taking care of routine affairs on his beat, will keep a watch for speeding and intoxicated autoists.

GOODYEAR OFFICIALS HONOR DE PALMA AT DINNER.

Ralph De Palma recently spent a day at Akron, O., as the guest of the Goodyear Tire and Rubber Co. All of De Palma's newly established records were made with the use of Goodyear straight cord tires. After a visit in the factory he was given a dinner by a party of Goodyear officials and the department managers. President F. A. Seiberling welcomed the great racer in behalf of the Goodyear organization. De Palma declared his appreciation of the part that Goodyear tires had played in his victories.

DORT ISSUES NEW MASTER PARTS PRICE LIST.

The Dort Motor Car Co., Flint, Mich., has issued its Master Parts Price List, covering parts for all models of cars made by the company. It sets a new high standard in automobile parts books. The book has 192 pages and is entitled "Dort's Parts List." All parts are illustrated and prices given.

AIRCRAFT FIRM INCORPORATES.

The Aircraft Material and Equipment Corporation, Manhattan, New York City, has been chartered with $100,000 capitalization by A. Johns, J. J. O'Connor and F. W. Bain, 55 Liberty street.

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ENGINE STARTERS ON AUTOS IN ENGLAND.

A result of the war in foreign motor conditions has been the very general adoption of the engine starters for the post-war models. The improvement has been due in no small degree to poor quality of fuel which English motorists have had to use for some time. The London Times said recently:

"In the best of conditions we are faced with a prospect of poor quality motor fuel for a long time to come—a palpable but unpleasant truth which must lead to changes. The National Benzole Association may help toward providing better fuel, but this at best is a matter for the future. The outstanding feature is that there must be changes in engine design, because good petrol is required for the average unit now in use.

Nowadays the engines more readily foul because of the poor fuel, and it is obvious that greater accessibility is needed when more frequent cleaning is called for. Low grade petrol needs better combustion conditions; lubricating systems must be improved because the properties of the oil are more rapidly lost; further, the cooling system must be readily adjustable for work under varying climatic conditions.

Opinions will differ as to the best means of meeting these requirements, but in the new cars it is essential that some trustworthy engine starter be fitted—no difference of opinion exists here. There is one possible exception to this broad ruling; in the cheapest and lightest class of car the cost of an electric starting set might be prohibitive, but the little engines can easily be 'swung,' while owners cannot reasonably expect every luxury and convenience in the cheapest cars."

COMPLETING WORK ON BRIDGE AT NEW LONDON.

Satisfactory progress is being made in the reconstruction work on the old railroad bridge over the Thames river at New London, which will be used extensively by motorists. One end of the draw span, 250 feet long, has been shortened 92 feet in order that the draw may not strike the new railroad bridge located 170 feet to the north. A counterweight on the short end of the span preserves the balance. After this bridge has been made a part of the highway system of the state, motorists en route to New York and Boston by way of New London will not be dependent upon the tedious ferry boat transfer, and there should be an appreciable gain in time and convenience before the summer is over.

JOINS STANDARD 8 NEW ENGLAND FORCE.

A newcomer to the sales force of George J. Dunham, Boston, New England distributor of the Standard 8, is Edward G. FitzHenry, who recently returned from France. He has been in the naval aviation service and was a member of a bombing squadron.

RESTRICTIONS IN WEST INDIES ARE REMOVED.

Automobile import prohibitions to many parts of the West Indies have been removed. In Jamaica restrictions against importing motor cars and accessories were annulled. The government of Trinidad and Tobago has just removed the restriction against the import of motor vehicles, which was imposed Aug. 1, 1918, to help conserve shipping space for necessary foodstuffs. There are no new motor cars at present for sale in the colony. Second hand motor cars are the only ones available for purchase there, and they cost as much as or even more than the machines originally did when new.

The Ceylon import duty on passenger automobiles has been reduced from 100 per cent. to 7½ per cent. ad valorem.

GRUESOME TRAFFIC SIGNS WARNING TO AUTOISTS.

Motorists entering the City of Newton, Mass., are confronted with unusual traffic signs that give visual warning of dan-



ger to those who disregard traffic regulations. Likenesses of two ambulances accompany legends that warn of the results of careless driving. The signs have a rather gruesome aspect and make a grave impression upon the autoists.

The radical departure from the conventional sign was due to the belief that most motorists need some striking warning of the dangers that confront them.

WOMEN DISTRIBUTORS OF LIBERTY CARS.

Two women, automobile distributors, are now included in the sales organization of the Liberty Motor Car Co., Mrs. Hope L. Gordon, manager and owner of the Onondaga Garage, Syracuse, N. Y., and Mrs. C. H. Kenyon, manager and owner of the C. H. Kenyon Sales Co., Utica, N. Y. Both are meeting with success.

JEWETT SAYS AUTOS ARE REALLY "CHEAPER."

Harry M. Jewett, president of the Paige-Detroit Motor Car Co., points out that considering the purchase power of the dollar, automobiles are cheaper than they were four years ago. He says:

"The price tag on a car as compared with the price on the same car four years ago does not tell the true story. To get a fair idea of the present price there are vital facts to be considered. These relate to the average individual's earning power—the price he can get for the things he sells to make a living and the amount of the commodity he makes which he must exchange in the open market for the article he wishes to purchase.

"The best illustration I can think of to explain this point is found in the business of the farmer. The latter's wages, or buying power, lie in his crops or their market value. The staple article on the American farm is wheat. In 1914, or about four years ago, the farmer received 90 cents a bushel for wheat. Therefore, if he wished to buy a car that then sold for say $1050 he, practically speaking, paid about 1166 bushels of wheat for it.

"Today if the car costs him as much as $1555 he has to pay only about 700 bushels of wheat for it because wheat now is valued at $2.26 a bushel. In other words, while the car has apparently gone up 50 per cent., it costs the farmer only 60 per cent. as much as it did four years ago."

BROOKLYN AUTOMOBILE SHOW IS BEST EVER.

Brooklyn's eighth annual automobile show opened with 44 makes of passenger cars and more than 150 complete cars and chassis. The decorative scheme, while less fantastic than the adornment of some previous automobile shows, was splendid and permitted the cars to be shown to advantage. There was a good display of accessories.

Special show cars, which were exhibited at the Boston and Philadelphia shows, were on exhibition. The second week of the show will be devoted to motor trucks, trailers, tractors, etc.

It was the general opinion that the show was the best ever in Brooklyn. The attendance was good.

Complete cars and chassis of the following makes were exhibited: Auburn, Baker, Buick, Cadillac, Chalmers, Chandler, Chevrolet, Cole, Davis, Dodge Bros., Dort, Elgin, Essex, Ford, Franklin, Haynes, Hudson, Hupmobile, King, Lexington, Liberty, Locomobile, Marmon, Maxwell Mitchell, Nash, National, Oakland, Oldsmobile, Overland, Packard, Paige, Peerless, Reo, S. G. V., Saxon, Scripps-Booth, Standard, Stephens, Studebaker, Stutz, Velie, Willys-Knight and Winton.

LOEFFEL GETS DISTRICT.

J. G. Loeffel has been engaged to cover Wisconsin, Iowa, Minnesota and Illinois for the Hudson Motor Specialties Co.

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PLATE XXXIII.

MODERN SERVICE STATION AND SALES ROOM

One-Story Building of Fireproof Construction Is Suggested for Average Dealer—Cost Reasonable with Accommodations Adequate.

Designed by the Architectural Department of the Automobile Journal Pub. Co.

NOW that building operations, abruptly halted by the war, are to be resumed, the Architectural Department returns to its place in the Automobile Journal. The accompanying sketches illustrate a few of the features embodied in the layout of a modern service station and salesroom. Such a building as herein suggested is intended for the average dealer, as its cost would be within his reach and the accommodations adequate for the needs of his business.

Fireproof Construction.

The structure would cover an area of 50 by 100 feet, the size of an ordinary city lot, and usually the only size obtainable in a desirable location. Our aim is to point out how compact, yet serviceable, a garage of this type can be made.

The plan is that of a one-story building of fireproof construction. The office and salesroom, shown in the forward part of the building, would be sufficient for the requirements of the average dealer. Flanking the office on the left is the entrance leading to the storage compartment, which is 50 by 60 feet, and which will house a considerable number of cars.

In the rear will be found a repair department, 24 by 18½ feet, having two pits to permit working on two cars at one time. This department could be well lighted by a large skylight, also affording ample ventilation.

Next we have the machine shop, the heart of the service station. Without such a place no station can give the service demanded in these modern times. Delay that would result in securing new parts could be saved by having the parts repaired on the job, or new ones turned out if necessary. The machine shop is so important that the dealer makes a mistake when he fails to provide for one.

Machine Shop.

The machine shop as shown in this plan would be 12 by 18½ feet, having room for a lathe, a punch, an emery wheel and a forge, also an anvil. A large sink is another feature. Provision is made for two toilets, one for the shop and the other for the office employees, and in these there would be modern lavatories with hot and cold water.

General Construction.

On the ground floor is a locker room for employees' clothing. A stairway leading to the boiler room occupies a portion of this room, as indicated in the plan. The boiler room is located underneath the space covered by the machine shop, toilets and locker room, and is 23 by 18½ feet. Special attention should be given to the location of the washstand and turntable, and the arrangement of them as this plan suggests will be found an advantage to all concerned.

The general construction is as follows: Foundation, concrete (see section); walls, 12 inches thick with 16-inch piers, and may be made with brick or cement blocks; main or front elevation designed for brick with concrete trimmings; steel beams used to support the roof, which is of plank covered with tar and gravel; floor four inches of rough concrete with two-inch dressing drained as shown.

Lighting would be furnished by large skylights in the roof, but which are not shown in the plan. A special feature would be a large door of wood automatically operated, being hoisted to the ceiling. The metal window sash shown adds much to the general appearance.

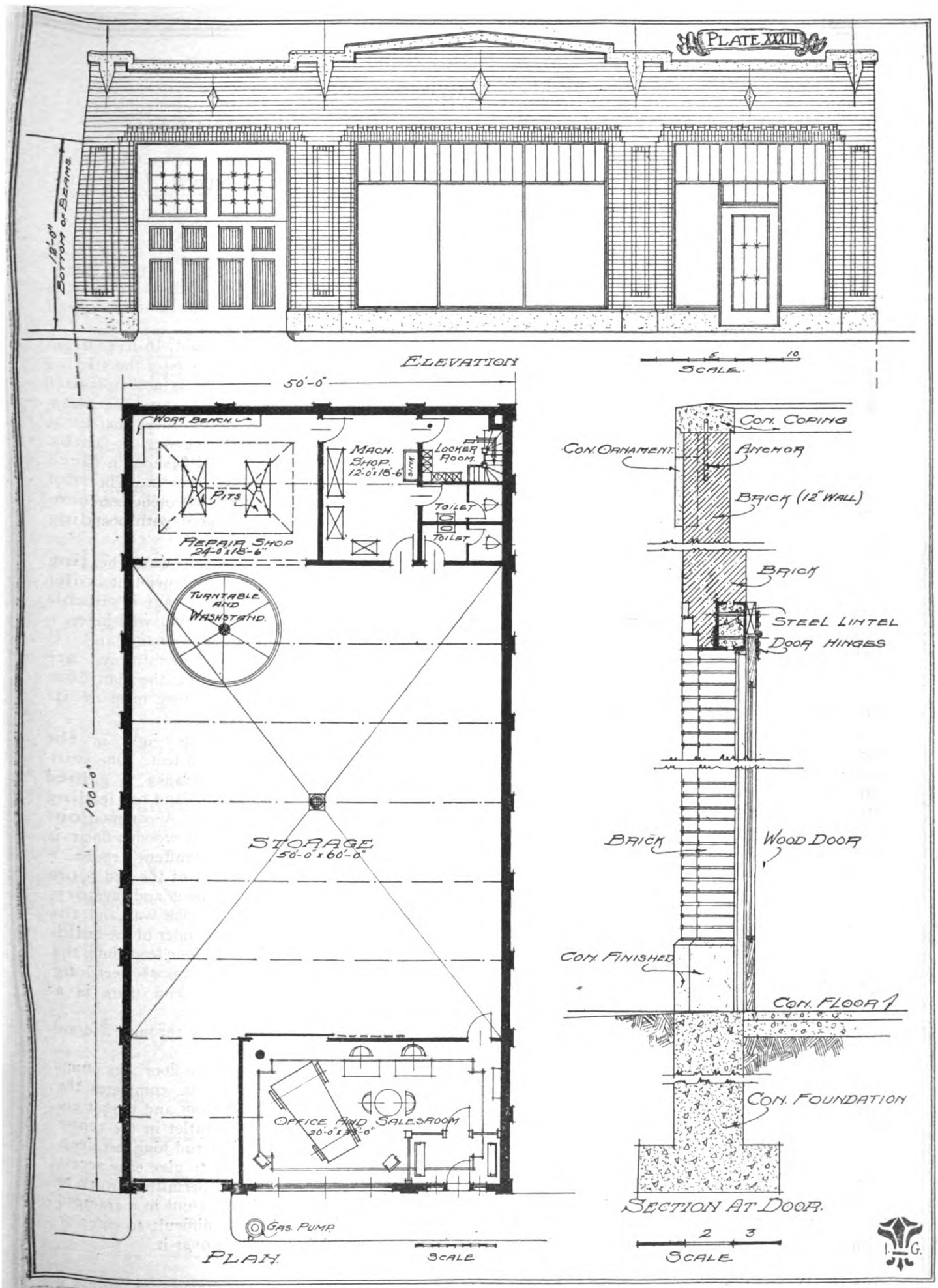
Cost of Building.

The cost of the building would be approximately $7500, equipped as shown. Any further details desired will be supplied on application to the Architectural Department of the Automobile Journal.

The plan presents many features that should prove valuable for a service station and salesroom, and the dealer who is contemplating the construction of a building to be used for such purposes will probably find it decidedly profitable to give careful consideration to these sketches. Of course, many variations could be made in the details and still the general plan followed.

The Architectural Department is having prepared plans for various types of buildings suitable for the use of those engaged in the automobile industry. Readers of the Automobile Journal are invited to write to this department for additional information in regard to any of these plans.

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PLATE THREE.

GARAGE WITH CHAUFFEUR'S QUARTERS

Semi-Fireproof One-Story Structure of Hollow Tile and Stucco With Appointments for the Housing of Two Cars.

Design by the Architectural Department of the Automobile Journal.

The accompanying plan, the third in the series on garage designs presented through the Architectural Department of the Automobile Journal Publishing Co., shows a private housing of exceptional appointments, provided with room and facilities for taking in and caring for two cars.

THIS is a garage provided with chauffeur's living quarters, making it ideal for physicians, or other professional men or persons, who may have occasion to call upon the services of their car at any hour of the day or night. Together with the completeness of equipment, it is also made possible to a large extent to have a great deal of the mechanical work and attention required by a car, thus called upon for fulsome service, done by its regular caretaker within the garage. How far this may be carried depends, of course, upon the judgments that always surround the circumstances in every case.

To build this garage so that it is comparatively fireproof, and at a cost of about $2100, is a matter capable of being adjusted between the builders' art and the market cost of materials, in almost any locality with ease and dispatch.

It is remarkable that in a one-story design the compactness of arrangement permits so large returns in advantages and conveniences. In general construction the walls are built of hollow brick tile, faced with stucco, and the inside of the structure, including the ceiling, is stuccoed with cement in a manner similar to the outside.

A steel gasoline tank is buried outside the building line of the garage, and a supply pipe is led from the tank to a measuring pump in the garage, thus minimizing the danger from fire and explosion. A small door provided in the rear saves opening the heavy front doors when it is not desired to take out the car. As the upper panels of the main doors are generously glazed, a well lighted interior is assured at all times and the arrangements of ingress and egress in ordinary are well taken care of.

As will be seen from the plan of the front elevation, it is a structure that would greatly enhance the value of any estate, and would be fitting in appearance to go with a very costly residence. As it is constructed of hollow brick tile, with a stucco exterior, it is subject to varied color treatment. To harmonize with adjoining buildings or the walls it can be surfaced in keeping with the ideas of the owner. A substantial concrete floor, faced with one inch of cement, a shingled hip roof, completes the description of the main structural details.

The main opening in the front, 16 feet, eight inches wide, is closed by two doors of the sliding type. Much economy of space is accomplished by the fact that both are sliding doors, one passing behind the other. Concrete wheel guards at either side of the opening protect the door jambs.

A brick chimney, with metal flashing, is faced with stucco and lined with terra cotta. The roof is framed of 2x6 inch rafters, 20 inches on centres, and the rafters are covered with boarding and shingles.

With electric lighting, a hot water heating system which runs from an independent boiler room, toilet and bed room, the garage is suitable for all the requirements of the man who hires a man to drive and do all the maintenance and repair work on his car, as the appointments are such that the question of keeping the man constantly about the place will lose most of its usually unfavorable aspects.

The bed room, located at the right, in the front end of the building, is 8x13 feet. One window opens on the side and entrance is gained through a separate door in front and one leading from the room into the garage. A commodious closet is provided in the rear. A wooden floor is laid over the concrete in the chauffeur's room.

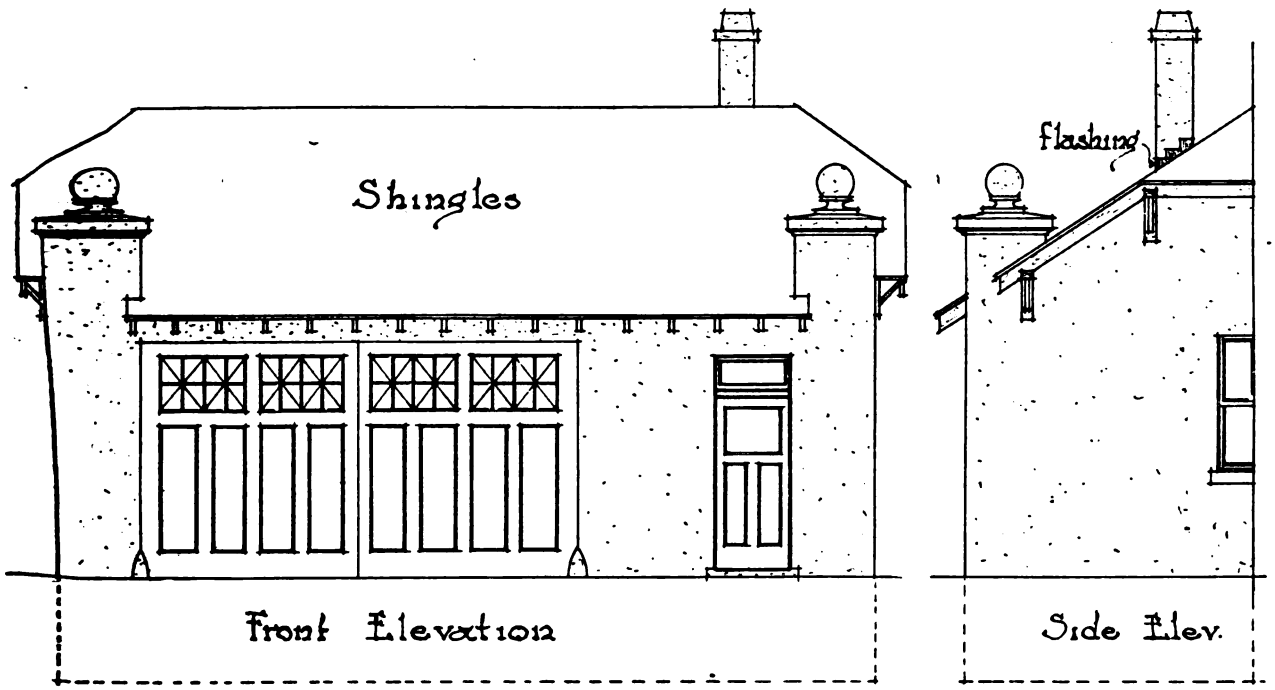
The space immediately back of the bed room is used for the heating equipment and lavatory, the two being separated by a brick wall and the former separated from the remainder of the building by walls on both sides. A door leads into the boiler room from the outside. It is 6¾ feet long by five feet in width. At one end there is a spacious coal bin.

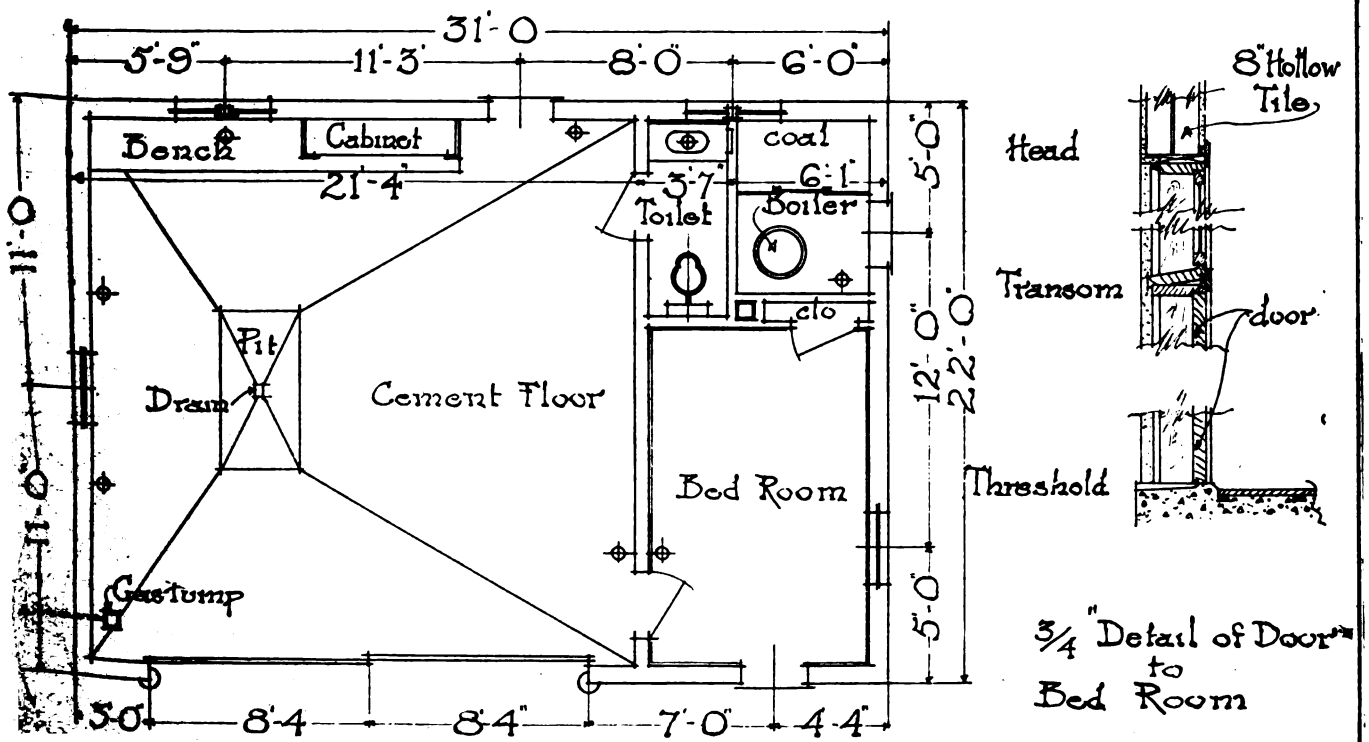
Entrance to the lavatory is through a door from the garage proper.

A work bench, cabinet, pit in floor, gas pump and overhead washing apparatus completes the general equipment. Both the floor and the pit are slightly dished to the drain outlet in the centre of the pit. The pit is 3x6 feet and four feet deep. thus allowing plenty of space to give easy access to the under body of the car, permitting work to be done on it with facility and not in a cramped position, making it also not difficult to enter or leave the pit while the car is over it.

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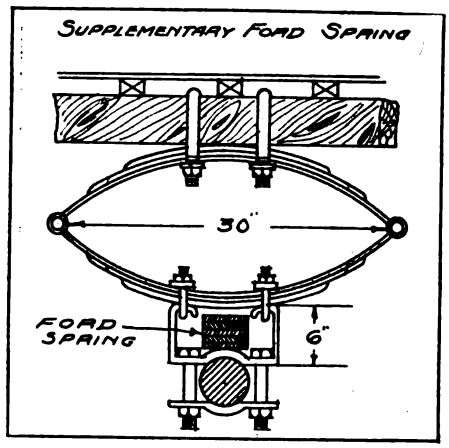
PLATE 3


Shingles
flashing
Front Elevation
Side Elev.
1 2 3 4 5 6


31'-0
5'-9"
11'-3"
8'-0"
6'-0"
Bench
Cabinet
21'-4"
coal
3'-7"
6'-1"
Toilet
Boiler
clo
Pit
Drain
Cement Floor
Bed Room
Gas Stump
11'-0"
11'-0"
5'-0"
12'-0"
22'-0"
5'-0"
3'-0"
8'-4"
8'-4"
7'-0"
4'-4"
8" Hollow Tile
Head
Transom
door
Threshold
3/4" Detail of Door to Bed Room

Plan

SUGGESTIONS FOR CAR OWNERS



SUPPLEMENTARY SPRINGS FOR FORD.

When the Ford car is converted to a truck for commercial use, the rear spring is often overloaded, because nearly all the extra load is carried on it. In addition to this truck bodies often carry the load rather high, so that there is considerable sidesway when rounding corners. This imposes unusual strains, which tend to break the rear spring.

A set of supplementary springs, which carry the load of the truck body out to near the ends of the Ford rear axle, can be made by using a couple of full elliptic springs, about 30 inches long. These springs can be from 1½ to two inches wide, depending upon the load. They should have about four leaves in each section. In order that these springs may not interfere with the usual transverse rear spring of the Ford rear axle system it is necessary to support the lower part of these springs on special brackets or clamps, instead of directly to the rear axle. These clamps may be made by any blacksmith, from iron two inches wide and one-half inch thick. The brackets are clamped around the rear axle housing by means of a pair of half-inch or five-eighths-inch bolts for each bracket.

The springs are fastened to the body sills of the truck and to the special brackets, by means of the usual U shaped spring clips. Sufficient space should be left within the brackets so that the regular Ford rear spring can move up or down to the full extent of its movement.

DELION CORD TREAD TIRES.

A new kind of pneumatic tire which is guaranteed to be permanently non-skid and adjustable on the basis of 7500 miles of service, tread being composed of a combination of rubber stock and fabric, with the fabric standing on edge so as to come constantly in contact with the road surface. This feature gives the tire its non-skid qualities.

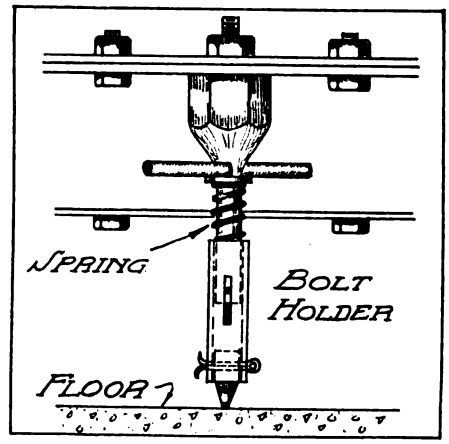
The tread construction of the tire is entirely different from any other for the fabric is impregnated with rubber under a new process by which the rubber is drawn into the fabric by suction instead of forced in by pressure. Thus the bond between the rubber and fabric is claimed to be much closer than by the other process.

DRUM HOIST.

The next time you are stuck in the mud or sand remember that you can fasten a rope to a tree or post, give it a turn around one of the rear wheel hubs and start the engine on either low or reverse, and by holding the rope taut the automobile will pull itself toward the post or tree. The action of the rope upon the hub is the same as that of a drum hoist. Of course it will be necessary to hold the other rear wheel stationary either by a rope or chain, unless it is on solid ground.

QUICK ACTING BOLT HOLDER.

When removing the bolts that hold the transmission cover and the cylinder block to the crank case, it is necessary to hold the bolts—to keep them from turning—while the nuts are being removed.



As these bolts are all at practically the same distance from the floor—but floors are not always even—it is possible to make a tool having a spring to act as a means of adjustment to compensate for any variations in distance, from floor to crank case flange, which may exist.

The socket fits over the head of the bolt, and this socket is kept from turning by the short steel rod, which strikes against the side of the crank case. The coil spring presses the socket up against the bolt—the top of the spring pressing against a washer.

The lower end of the spring presses against the piece of pipe which forms the body of the tool. A steel pin, working through a slot in the side of the pipe, keeps the tool from coming apart when not in use.

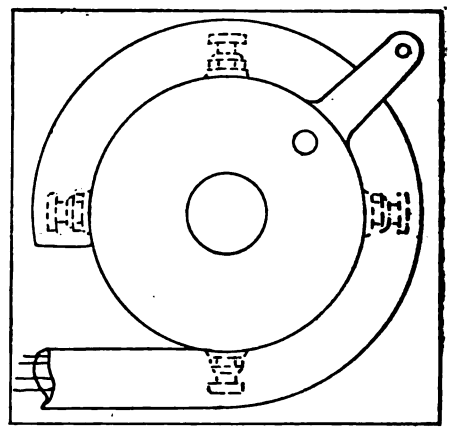
A pointed steel plug jams into the floor and keeps the tool from slipping out of the position in which it is placed. The plug is held in the lower end of the pipe by a cotter pin, passing through both pipe and plug.

ELIMINATING OIL LEAKAGE.

On all Ford cars of recent models there are one-quarter inch holes drilled in the cylinder block directly over the camshaft, one hole between No. 1 and No. 2 cylinder valve lifters, and one hole between No. 3 and No. 4 cylinder valve lifters. These holes are to carry the oil that comes up through the valve lifters back to the crank case so as to prevent it running down the outside of the motor. Any owner of the earlier models which did not have these holes drilled and are bothered with the oil leakage and cannot have holes drilled very easily, will get some relief by drilling a one-eighth inch hole in the upper corner of each valve cage cover. There is more or less vacuum in the valve cage which helps to suck up the oil. When there is a small hole in the corner of the valve cage cover there can be no vacuum. It is recommended to drill this small hole in the valve cage covers on all Ford cars.

TIMER INSULATION.

A large percentage of electrical troubles on the automobile are caused by the breaking down of insulation by oil or water and consequent short circuiting of the current. This trouble frequently is found at the points where the timer wiring is connected with the timer in the Ford car. Obtain a piece of circular loom (the largest size) at any electrical supply house, long enough to extend from the dash board to the timer and once around it, and starting about half an inch from the end cut four holes through one side just large enough to slip over the timer binding posts, the distance between them being the same as the distance between the timer binding posts. Now connect the wires with the timer and pull one through each hole in the circular loom, winding the tube around the timer and pulling the wires tight to hold it in place. When all wires are pulled tightly in the tube and the circular loom slipped over the tops of the binding posts as shown in the illustration, it will be impossible for oil or water to reach the wires. The circular loom is flexible enough to permit easy turning of the timer.



Suggestion for Method of Insulating Ford Car Timer.

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HANDY TUBE RACK FOR THE REPAIR SHOP.

A very handy rack that will save its cost many times over can be made in a few hours time by any one handy with tools for holding tire tubes that are brought in for repair, and for the tubes used in the regular shop cars. It can be made as follows:

From your local lumber dealer procure the following:

Fifteen pieces eight feet by six inches grooved and tongued stock, ¾ inches thick.

Six pieces six feet by six inches grooved and tongued stock ¾ inches thick.

Twenty-four pieces 18 inches by 18 inches planed, ¾ inch thick.

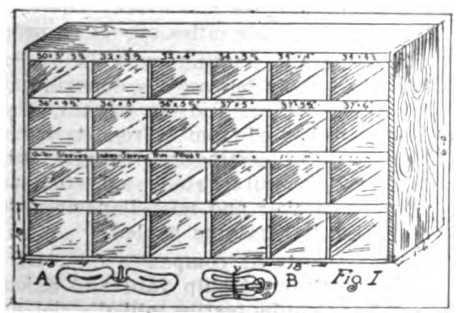
Four pieces eight feet by four inches by ¾ inch thick.

The eight feet by six inch pieces are to be used for shelves, made up of three of these strips of grooved and tongued stock. There will be four shelves and one section for the top of the rack when finished.

The six feet by six inch pieces are used for the sides, three for each side. This will make the shelves eight feet long by 18 inches wide. And the sides six feet high by 18 inches wide.

After the shelves have been put together, take the No. 1 or bottom shelf and mark off on one edge points 18 inches apart. Do the same on the opposite edge. These marks will give the centers for the 18 inches by 18 inches partitions. These may be secured in place from the under side by nailing. These nail on the sides. Put in the second shelf, nailing the ends to the sides 18 inches from the lower shelf. Nail the lower partitions to this shelf also. This second shelf is to be marked off into 18 inch spaces, the same as the first shelf. Put partitions in place on this shelf, holding them in their proper positions with either cleats in the corners or toe nailing them with wire nails on the ends. Put the third shelf in place as you did the second and continue with the others till you reach the fifth and last. This goes on top to complete the rack. Take one of the eight feet by four inch pieces and nail this to the front edge of the shelf, allowing it to overlap above and below the shelf about 1½ inches. Put the other strips on in like manner. These may be used to carry the box numbers or sizes as the case may be.

This rack may be set on the floor in the stock room, placed against the wall, or raised from the floor, and fastened to the wall by brackets at the bottom. As a storage rack for tubes this has proved very useful, as the tubes come from the repairer they are folded as in Fig. B, strings tied around them carrying the owners' names. They are then put in the bin carrying their sizes at the top, to remain until called for. The completed rack is shown in Fig. 1.

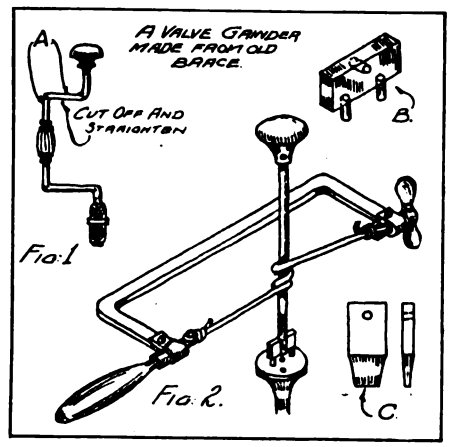


HANDY VALVE GRINDING TOOL.

To make a handy valve grinding tool that may have interchangeable heads take an old bit brace such as may be found around any private work bench, straighten out the bent sections and cut off the end. Slot this end with a hack saw and drill to receive the end or head that does the valve grinding. Bore a hole through the ends of the slot and thread and countersink this to receive a screw.

To make the head piece, take a piece of stock ½ inch thick by ¾ inch deep, drill a hole in center of this to match drill hole in the rod and thread this the same way as rod. This head piece should be as long as the face of the valve to be ground. Holes are bored in this as shown in the sketch at B to receive pins a short distance in from the ends to match the holes in the top of the valves.

Another type of valve has a slot in the head and for this you want a piece of

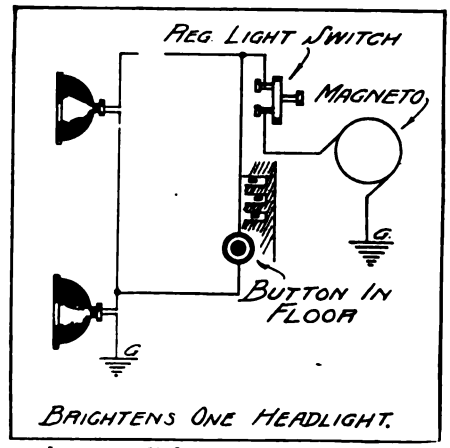


flat stock about 1½ inches wide, one inch long and as thick as the slot in rod is wide. Drill a hole in the center to match the hole in the end of rod and thread it. Heat this piece of stock, draw one edge down with a hammer to fit the slot in the head of the valve and fasten to the grinding tool with a screw.

Take a hack saw frame with a piece of rawhide or heavy string wound several times around the valve grinding tool, as shown in cut. Hold one hand on the top of the valve grinding tool and with the other hand push the handle of the hack saw frame back and forth from you. This will give a rotary motion to the grinding tool, reversing it at the end of each stroke. The cost is practically nothing except the time required to make it.

BRIGHTENS ONE HEADLIGHT.

When driving slowly in high gear there may not be enough current to burn both headlights brightly. But by sending all the current directly to the left headlight it will burn brightly and give



much more light than both headlights burning dimly.

The original wiring is left intact. A wire is tapped into the light circuit just back of the dash and on the wire leading to the right head lamp. Lead this wire down under the floor boards to a point at the left of the pedal plate. Bore a hole here for the wire to come up through. Leave about two inches of wire for making connections. Lead a wire from this point to a point on the wire leading between the headlights. Tap in this wire at a point near the left headlight. Where the two wires pass up through the floor boards, attach a push button. Use a button on the style of a horn button. When driving at night slowly all that will be necessary is to put the toe of the shoe on this button. The left light will show brightly, giving you a good driving light at slow speed. Care must be taken, however, to remove the toe from the button when accelerating speed.

ON VULCANIZING.

In vulcanizing casings, which it is not always necessary to remove from the wheel, three layers of cement should be applied, each one being allowed to dry. The cut should be filled not quite level with the surface with scraps of rubber supplied for the purpose. If the hole is filled too full the rubber is likely to expand and run over the surface which has not been prepared and this thin film will soon peel off. When fixing a sand pocket care must be taken to fill the hole where the sand found entrance, which may be a foot away from the pocket as finally developed.

STARTING IN AN EMERGENCY.

When the starter is not working and the crank handle cannot be found it is possible to start the engine by jacking up the rear wheels and shifting into high. The cylinders must be primed and the spark and throttle levers set. The engine is started by turning the rear wheel, taking hold of the tire rather than the spoke. Care should be taken to avoid getting caught when the wheels start to revolve.

Now is the time to overhaul the car and see that it is in good running condition for the coming season.

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COOPERATIVE TRUCK CONTRACTING

Speedwell Motor Service Co., Philadelphia, Sells Machines, Operates General Garages and Manages Business for Drivers Who Own the Trucks in Use.

By K. Herrick

WITH a fleet of power trucks consisting of 10 Atterbury, four Hall and two Speedwell machines, the Speedwell Motor Service Co., Inc., Philadelphia, operates a very prosperous contract haulage business, the activities of which are generally in the Quaker City and its suburbs. The work is generally miscellaneous and in some instances is unusual, but it all comes under the classification of transportation.

While the company has this fleet of trucks regularly in its service, as a matter of fact it owns but the two Speedwell machines. All of the other trucks are owned by the drivers, so that the concern may be considered cooperative, the work is obtained by and supercontract for haulage the service of the company is far better than having lists of individual owners of trucks who might be available, seeking them when transportation is desired, and depending upon those not well known to them for work that may be extremely important. The truck drivers of the Speedwell company work together for the common good and each shares in the business that is developed. There are times when the fleet is added to for a special work, when there is need of more units than it ordinarily controls, and then men who are reliable and whose service will be up to the standard are temporarily engaged.

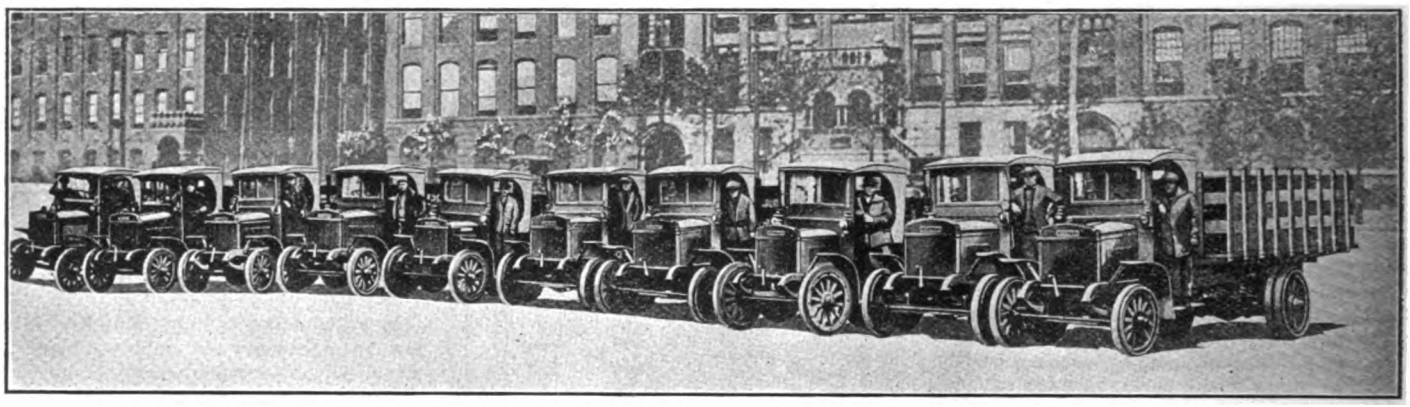
William P. Vees is president and Frederick W. Vees secretary and treasurer of the Speedwell company. The former before engaging in contract hauling, operated a motor truck agency. When he decided to change from selling trucks to operating them, for he reasoned that as he had sold power trucks to a number of careful, competent men who were either expert drivers themselves, or would engage only first class drivers to work for them, it would be better to establish himself by relying on these men and their equipment as a nucleus for a service fleet and perhaps increase this from time to time by adding his own vehicles. Naturally this plan meant cooperation in a broad sense, the administration being in his hands.

He sold trucks, the buyers paying 25 per cent. cash and giving 12 notes of equal amounts, one due on the first of each month. These buyers who made contract with his company were given work, this being impartially allotted to them. They were credited with the work they actually did with their trucks. The company, which has a large garage and repair shop, together with its office, as now operated charges storage for these trucks and sells the owners gas and oil. This again shows the benefit of cooperation, which is novel, at least for Pennsylvania, although there are many concerns doing contract haulage brokerage.

Storage is charged at the rate of $15 a month and, of course, it is "live" storage. Oil costs the truck owners 60 cents a gallon at the present time and gasoline 27 cents. The company's office and garage is well located for business—it faces 1335 Frankford avenue, is at a corner and the building extends through to the next street in the rear, Crease street, giving access and egress from both front and back. A general storage business is done to reduce overhead expense. At the present writing 28 cars, in addition to those used by the company, or 45 in all, are stored nightly here.

Operates Fleet of 16 Trucks.

The company's fleet units are as follows: Nine Atterbury trucks of 3½ tons capacity each, one two-ton Atterbury, four Hall trucks of five tons capacity and two six-ton Speedwell trucks. All these machines have express bodies. Notwithstanding that the bulk of the company's business is hauling for building operations, it has not been found necessary to provide winches, body hoists or dump bodies.



The Atterbury Trucks Operated by the Speedwell Motor Service Co., Philadelphia, Nine 3½-Ton and One Two-Ton, Operated Practically on a Cooperative Basis in General Contract Haulage, Much of the Work Being Local.

As the company is not engaged in inter-city hauling on regular schedule, it has not been necessary either to equip any of the trucks with van bodies. In fact, because of the nature of the business, and much of the loading and unloading is done with cranes, it would not be practical to use vans. The express bodies, however, are built so that bows can be used when necessary to support tarpaulin canopies and sides. There are no runs to outside cities except on order.

Most of the hauling work is by contract and a big business is done in moving stone, lumber and terra cotta. Case goods are hauled from railroad terminals and piers to destination, usually warehouses; structural steel, asbestos, machinery, leather and miscellaneous loads are the usual freights hauled.

The Speedwell company's quarters is close to Cramps' ship yard and adjoins the Kensington textile mill district and the concern draws considerable business

intended by the Speedwell company, so that there is uniformity of service, an established responsibility and reliability that has attracted practically all of its business.

The fact that the drivers are truck owners and have a direct interest in the company and its service is looked upon as being as strong a guarantee as could be presented. The drivers are responsible to themselves for their trucks because upon their conditions depends the return they receive upon investment of both capital and labor, and the earnings are practically in ratio to their endeavors.

The Speedwell company is the operator or manager, for it makes all contracts for work, establishes the prices, makes the collections and adjustments, pays all the expenses and receives 10 per cent. of the net earnings of each truck as its share of commission. Controlling a fleet of machines that it can operate as its own the company can undertake work of large volume or magnitude.

Cooperative Service Is Dependable.

From the viewpoint of those who make

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The Kind of Service That Earns Business: Machinery Climbing the Mountains **Speedwell Six-Ton Truck with Load of Near Bethlehem—a Hurry Work.**

from these sources, in the former instance the loads usually consisting of propellers and heavy anchor chains—these being in sections, four loads to one chain, as they are extremely heavy, each link being 3½ inches wide.

In moving textiles one class of work is transporting raw materials from railroad terminals, shipped from Macon, Ga., and vicinity, conveying them from the car sides to the Kensington mills. Hauling also is done for the Ohio Match Co. and R. A. Humphrys Sons, awning makers.

Quick Trips with "Kosher" Meats.

One of the most novel and interesting transportation problems is hauling kosher meat for D. B. Martin Co. and the Consolidated Dressed Beef Co. from Philadelphia to New York City's down town Jewish markets. There is always breathless haste about this work, as the meat must actually be delivered in 12 hours into the kosher butchers' hands, as it must be eaten within 24 hours of the killing to be "strictly kosher." Atterburys always are used in this "sure footed" run.

While the company's running time between Philadelphia and New York is 10 hours, it takes some nervous suspense and no little hurry to make actual delivery in the markets in New York within the prescribed 12-hour period. It would not do to have meat turn from "kosher" to "trefa" because of delay on the road.

The company's trucks also have helped to move part of Delaware county into Philadelphia county, or Philadelphia city, both being identical in boundaries. That was when the trucks were engaged in hauling sod from Delaware county to New Cathedral cemetery, a distance of 20 miles.

When the Edward G. Budd Manufacturing Co. of Philadelphia, maker of steel automobile bodies, moved from its old quarters on Ontario street to its present factory at 25th street and Hunting Park avenue, the Speedwell company's trucks picked up the machinery at the first mentioned address and conveyed it quickly and accurately on to the spot of assembly. That was a five-mile jaunt.

A year ago last fall, when many lives were lost in the big explosion of a munition plant at Eddystone, the Speedwell company was asked to rush coffins to the scene of the disaster. On short notice it was able to do so, using two trucks in the run and placing 24 coffins on a 3½-ton Atterbury truck.

Specializes Outing Transportation.

The most novel use of all made of the company's trucks is in the summer time, when a business is made in the slack periods of transporting school picnic and outing parties. As many as 400 scholars have been carried in the 3½-ton Atterbury trucks in one day—there being 60 to a truck. Valley Forge is a favorite outing spot for the school children. Three long, specially made benches are placed in each truck for these occasions—one extending down each side and one through the middle. The public schools prefer to have the children ride in the trucks to going by railroad for several reasons, one being that the trucks take the party directly to points of interest and debark the scholars on the spot chosen; another is that the ride is pleasanter, and still another is that it is cheaper. A charge of $25 a truck for the return trip is made in the case of nearby points and it has proved a profitable way of turning wheels when regular hauling is at a minimum, or some of the trucks might otherwise be idle for a part of the time at least.

Seven trucks have been filled at a time with school children, covering a 50-mile trip. Sunday school picnics have been transported and children's parade floats have been provided by the Speedwell Co., the picnickers often choosing Fairmount Park as an objective point, with Wissahickon and Chalfont as alternatives. Of especial interest to the motor car trade is the fact that the company in the baseball season carries the team of the Edward G. Budd Manufacturing Co. to whatever out of town point it plays.

The Hess-Bright Manufacturing Co., maker of ball bearings, sends its picnic and outing parties to and from the destinations in the Speedwell company's trucks. This goes to show how opportunity awaits the man or company operating trucks if he or it is alert for business.

As to the zone of the company's operations, it is limited only by orders. While, as previously mentioned, there is no daily long distance schedule of hauling, no regular daily inter-city service, the company's trucks take merchandise or raw materials quite as far as the companies which specialize long distance trucking. Familiarity with the practical garage and repair ends of the business helps the company keep operating expenses down to a minimum. Hauls frequently are made to Aberdeen, Jersey City, places in Connecticut and other New England states; Baltimore, Reading, Harrisburg, Elizabethtown and, of course, Camden, across the Delaware river by ferry.

Runs have been made to Brooklyn and return on but 47 gallons of gasoline. The drivers usually plan on going 40 miles in a 10-hour day. The company deems night the best time for road driving, when it is convenient, as there is less likelihood of accident, the motor is cooler and, quite important, the carburetor vaporizes the gasoline better, producing a superior mixture and making the truck operation "sweeter."

In all of last winter's hard storms and deep snow the company's Atterburys never missed a day, nor were long delayed on the road. A point made by the company is to instruct that non-skid chains shall not be used on chain drive cars, as it is claimed the chains "interfere," although such chains are favored for winter driving on worm drive units.

Anchor chains are carried for safety in winter, with half-inch links. Only the driver mans a truck when out-of-town trips are made, except in the case of unusually heavy loads, when a helper is added.

Two experts are employed in the repair shop, where there is a complete machine and tool equipment and where all the cars are given such repairs as may be necessary—which thus far have been slight.

Prices for Special Work.

Considerable hauling for the government was done during the last summer and fall and it is interesting to note some of the contract prices, as follows:

One five-ton trip from Philadelphia to Brooklyn, Long Island City and Port Jefferson, L. I., for $100 the trip.

Thirty five-ton trips from Philadelphia to Jersey City for $100 the trip.

Forty five-ton trips from Philadelphia to Aberdeen, Md., for $80 the trip.

These trips were made on 24 hours' notice. The armistice prevented about 50 per cent. of the entire work specified in the contracts from being completed.

Reviewing the company's arrangement with the owner drivers, settlement is made for the previous month by the 10th of each month. The company's bookkeeper gives each owner a report, showing business done and expenses, including the company's commission. The owners keep their own individual accounts for comparison. No receipts are given, payment being made by check. There is a daily truck report to be filled in by each chauffeur. Each driver, on coming in at night, gets his report form from the bookkeeper's stack of forms and fills in the proper entries.

(Continued on Page 46.)

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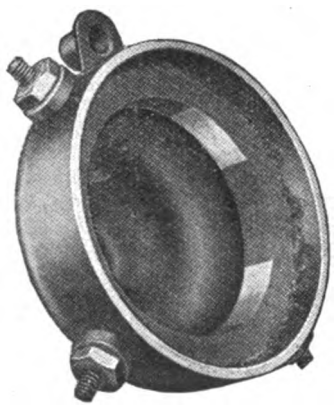
ACCESSORIES, EQUIPMENT AND TOOLS FOR THE GARAGE AND REPAIR SHOP

Hudson "Sliding Contact" Timer Brush. The patented Hudson "Sliding Contact" Timer Brush, with the film of ever present oil between the nub and contact bed, glides smoothly and certainly around the commutator and, as is only natural with a non-rotating body, it pushes whatever (dust) may be in its path out of the way and of a consequence automatically keeps the entire circumference free and clear of



everything except only that amount of oil necessary to reduce wear to a minimum.

It is a known fact that if oil or grease is kept free and clear of dust it will automatically flow to the point of greatest action, and, as the greatest action is be-



tween the contact bed and the nub of the patented Hudson "Sliding Contact" Timer Brush, the lubrication by reason of no dust is always pure and working at its highest efficiency.

Manufactured by the Hudson Motor Specialties Co., 1932 Arch St., Philadelphia. Price, 60 cents.

Garage Safe. The Lazarus Manufacturing Co. has added to its line of safes a new model, styled F No. 9, which may be used in the garage, store or in the home. The safe is 16½ inches high, 12 inches wide and 13½ inches deep, and weighs 125 pounds. The walls are two inches thick.

The manufacturer states that the safe is filled with a fire-resisting composition. The steel walls and interior compartments



are electrically welded, rendering them fire and thief proof.

Manufactured by the Lazarus Manufacturing Co., 770 Prospect Ave., Cleveland, O. Price, $25. Catalogue on request.

B-W Ammeter. Because the manufacturers of automobiles realize the importance of an ammeter in the electrical equipment, most modern machines are being fitted with such a device to indicate the passage of current to and from the battery. Many of the older machines do not have such a device, however, and, where posible, it is advisable to install one. The B-W Ammeter has a case of drawn brass, either nickeled or finished in black rubberoid. It is supplied in either surface or flush type. The glass

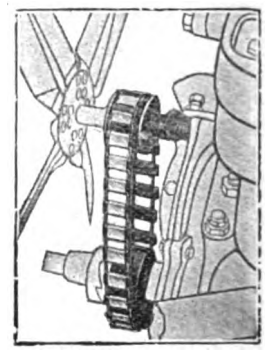


is held in place with a special baked cement which the manufacturers claim will not crack. The movement is said to be practically vibrationless, that is, not effected by engine or rough road jars. It is of the permanent magnet iron vane type with no moving coils or fine hair springs.

All of the parts are of relatively large dimensions. The scale is of the usual etched metal finish and several different finishes are optional.

Manufactured by the Ballman-Whitten Manufacturing Co., 4060 Forest Park Blvd., St. Louis, Mo. Price quoted at request.

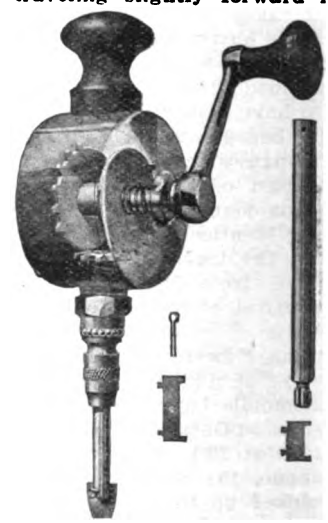
The Crow Mechanical Fan Belts are made up of links and containers which hold flat leather inserts. It is claimed that with this combination of steel chain and leather friction surface the belt is both flexible and has great gripping qualities. The manufacturers say that but little tension is required for maximum efficiency and that direct contact is assured at all speeds. The links are adjustable



and removable, the leather inserts being slipped from the belt at the side, allowing the attaching or renewing of links as desired.

Manufactured by Mechanical Belt Co., 1202 Frederick Ave., St. Joseph, Mo. Price quoted at request.

The Sioux Valve Grinder consists of a handle or crank operated wheel which drives through suitable gears the grinding tool. The gears are so arranged that by a continuous turn of the crank the tool is given a reciprocating motion, always traveling slightly forward in one



direction, then in the opposite, until the whole circumference has been made. With the tool are furnished three special valve head fittings and a special length of shaft for extension purposes. Prompt deliveries.

Manufactured by Albertson & Co., Sioux City, Ia. Price, $6.

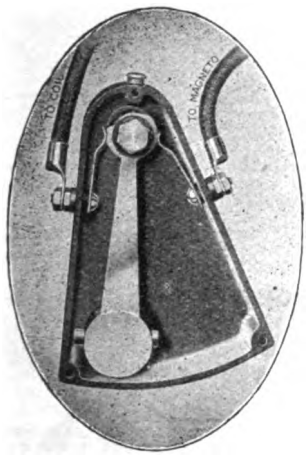
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Apco Safety Switch for Fordson Tractors. The Fordson tractor, like all powerful worm driven tractors, is inclined to tip over backward if driven carelessly. The



Apco Switch is designed and is guaranteed to prevent an accident of this kind, as it shuts off the ignition current when the front wheels rise to a predetermined height.

It is constructed on the pendulum principle, which cannot fail to operate, and at the same time it will not swing and break the circuit when the tractor is going over uneven ground. It is located near the magneto plug at the side of the engine



and held by two of the crank case bolts.

The installation is simple. The material is malleable iron, brass and the best bone fiber for insulating. The finish is Fordson gray and when installed it looks as if a part of the regular equipment. The weight, ready for shipping, is five pounds.

Made by Apco Manufacturing Co., Providence, R. I. Price, $6.

The Universal Battery Charging Clips are for use as a quick and ready means of connecting storage batteries for charging. They enable one to charge lighting and starter batteries without disconecting them from the car. Being made with



spring jaws fitted with sharp teeth, they bite through dirt and corrosion on terminals and make contact with the metal certain. The trouble caused by loose connections is eliminated with this form of contact.

Manufactured by R. S. Mueller & Co., 424 High Ave., Cleveland, O. Price quoted at request.

Retlaw Ford Car Gauge. A gauge by which is indicated the number of gallons of gasoline in the tank is a convenient and time saving accessory for any car. Not only handy, but also very practical for determining the actual mileage made upon a certain consumption of gasoline; an important item to watch now that fuel is so



high. The Retlaw gasoline gauge for Ford cars is designed to fill this want. This gauge consists of a float mechanism suitably linked to a dial upon which is plainly marked a scale in gallon units. The gauge is very easily and quickly applied and when in place forms the filler cap.

Manufactured by Retlaw Manufacturing Co., 812 Woodbridge St., East, Detroit, Mich. Price in U. S., $1.

Leak Proof Cement is a Blue Ribbon product that is different from the ordinary preparations of this kind. It acts quickly and stops leaks without any danger of clogging the radiator system. When poured into the radiator the cement dissolves thoroughly, and as the solution comes into contact with the air at any leak it immediately closes the opening and mends it by forming a permanent and lasting cement filling. This cement cleans out the circulating system and prevents

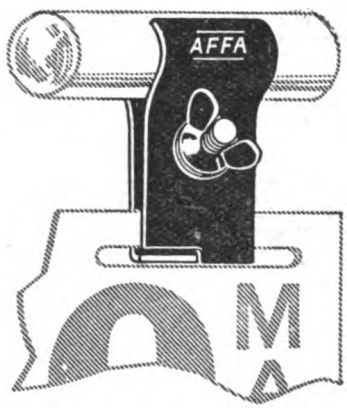


scale and rust from forming. This preserves the metal and increases the cooling efficiency.

Manufactured by the International Metal Polish Co., Inc., Indianapolis, Ind. Prices, 75 cents for seven ounce can; 25 cents for 2½ ounce can.

Affa License Plate Holder. This is the latest addition to the line of the Affa Specialty Co., Worcester, Mass., which company makes the well known line of Affa Anti-Rattlers for Ford cars.

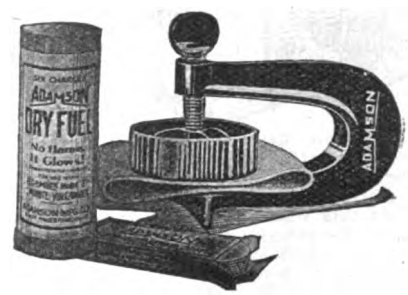
The License Plate Holder fits all sizes of tie rods on any car, and clamps the license plate very firmly, yet with sufficient flexibility in the material to allow



it to spring just enough to make a long, flat contact, thus preventing any vibration or whipping motion. It will hold the plate either above or below the supporting rod. It is made of pressed steel, finished in black enamel, and is sold under a liberal guarantee.

Manufactured by the Affa Specialty Co., 34 Southbridge St., Worcester, Mass. Price, 50 cents per pair, delivered.

Adamson Vulcanizer. An entirely new and improved feature in portable vulcanizers is the use of the new dry fuel in the Adamson model "E" outfit for repairing tire punctures. It consists of a powdered dry fuel, which when poured from the measuring cup into the receptacle and ignited burns with a hot glow without flame, vulcanizing the patch permanently.



The outfit includes vulcanizer, can of Adamson dry fuel, a box of 12 patches, measuring cup, sandpaper and directions.

While serving its purpose as well as any of the large outfits for vulcanizing, it is much handier and efficient, as it can be packed away in the car among the tools or in any small space and is ready for use at an instant's notice. With such a device in the tool kit the motorist can cease worrying about possible punctures.

The Adamson Mfg. Co., East Palestine, O. Price, $1; extra box of patches, 25c; extra can of dry fuel, 50c.

Horn Button. The horn button on a Ford car is located at the front of the steering column, where it is hard to reach. A more unhandy place would be hard to



find. The new Apco Button is attached to the throttle or gas lever, where it is under the driver's finger at all times, and the horn can be sounded easily and quickly even with heavy gloves on.

It consists of the button, bracket and wire ready to attach. To install, simply attach the bracket to the lever, connect the wire to the wire removed from the old button, wrap joint with tape and the job is done. Each button is packed in a box weighing two ounces.

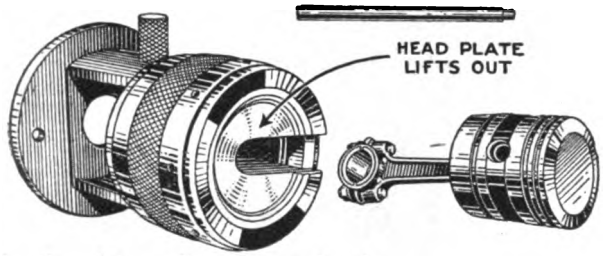
Manufactured by the Apco Manufacturing Co., Providence, R. I. Write for prices.

Greenleaf Auto Polish. This may be used on various parts of the car, body, fenders, hood, windshield, headlights and metal trimmings. The expense of repainting a car may often be delayed or avoided by the use of Greenleaf Polish. It restores the original beauty to all surfaces and leaves a clean, dry finish, lustrous and durable, to which dust will not adhere. Greenleaf Polish may be used with a sprayer if desired.

Manufactured by the Greenleaf Products Co., office and laboratory, 63 Northampton St., Boston, Mass. Distributed nationally by Farley & MacNeill, 105-107 Federal St., Boston. Price: Pint, 60 cents; quart, $1; gallon, $3; trial size, 25 cents.

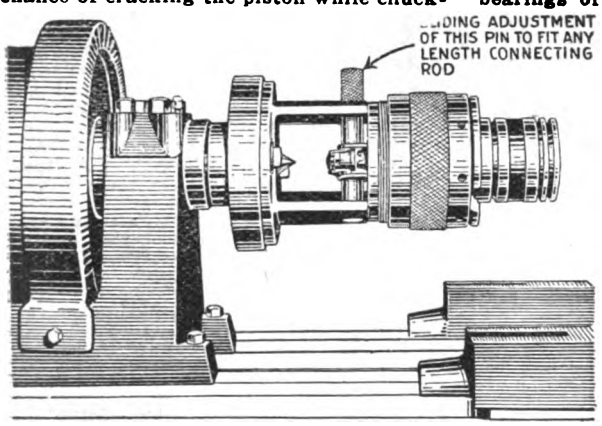
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Time Saver Piston Chuck. Every intelligent automobile engineer and repair man knows that the eccentric as well as the concentric piston rings wear the grooves



in the piston after the engine has run from six months to one year and that retruing the grooves is absolutely necessary if new rings are to give satisfaction.

To do this without removing the piston pin and the connecting rod from the piston—to do away with the time wasted in truing each piston separately in the lathe chuck, and to do away entirely with the chance of cracking the piston while chuck-



ing it, which when it happens knocks all the profit out of the job. To do away with all of these difficulties and expenses is the function and purpose of the Time Saver Piston Chuck.

The Time Saver Piston Chuck will hold any size piston and connecting rod and in addition it is so constructed that rough cast pistons can be turned on it. No time is lost in truing the Time Saver Piston Chuck in the lathe, it being so made that when clamped to the face plate it will run dead true.

Manufactured by the Time Saver Piston Chuck Co., St. Louis, Mo.

Cassco Engine Driven Tire Pump. This pump is simple and scientific in design. It takes up little space, and is easy to install. The air from the Cassco pump is dry and clean. The design of piston and cylinder prevents oil spray. The pump will inflate a 34 by four-inch tire to 80 pounds pressure in 90 seconds.

It is hard, dirty, tiresome, back-breaking job to inflate a tire with an ordinary



hand pump, and it is not efficient either. Rather than undergo the work, an autoist is inclined to cut the job as short as possible and the tires are not properly inflated. The Cassco engine driven pump saves this energy and time, and pumps tires quicker and better than one can possibly pump them by hand.

Edward A. Cassidy Co., Inc., Madison Ave. at 40th St., New York, N. Y. Price, $15; special outfit for Ford cars, $10.



Fire-Fly is a chemical fire extinguisher that not only puts out the fire quickly, but cannot damage the machine. It is a dry powder and contains no grit to cut the bearings of the engine or other working parts.

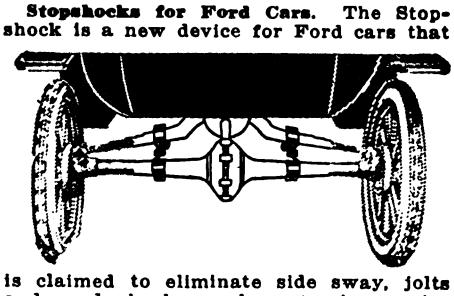
Manufactured by the Northwestern Chemical Co., Marietta, O. Price, tubes, 2x12 inches, 50 cents; 2x22 inches, 75 cents.



Safety Waste Can. The question of fire hazard in a garage is an important one, and it is the owner's duty to reduce it to a minimum by doing all in his power to prevent careless disposal of oily waste. The illustration shows the Dover Safety Oily Waste Can. These cans are made of heavy galvanized iron and by a special process of construction there are no soldered joints. The cover is held closed by a patent self-closing spring which, it is said, is not susceptible to wear. This can may be obtained in either a round shape or half round.

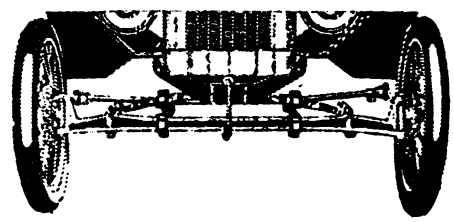
Manufactured by Dover Stamping and Manufacturing Co., Cambridge, Mass. Prices range from $2 to $13.12, according to size.

Stopshocks for Ford Cars. The Stopshock is a new device for Ford cars that

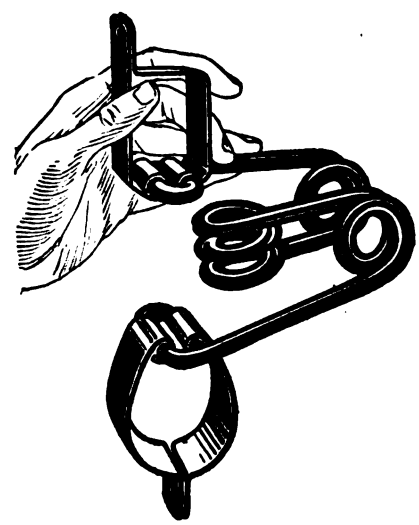


is claimed to eliminate side sway, jolts and road shocks, makes steering easier and driving safer. A set of four Stopshocks—two in front and two in the rear, located between the springs and axles, govern the action of the springs, protect them from breakage and absorb the jars and jolts. They snub the rebound and make a Ford ride as comfortably at 25 or more miles an hour as at 12. They cushion the sudden downward drop, reduce the wear on the motor and axles, prolong the life of the car, give more mileage to the gallon of gasoline and increase tire mileage.

Many Ford owners who have equipped their cars with Stopshocks are more than



pleased. The K-S Supply Co., manufacturer of Stopshocks, is arranging for distributors throughout the United States to supply the demand for this popular device.



Manufactured by the K-S Supply Co., 415 Fisher Bldg., Chicago. Price, set of four Stopshocks, $7.50.



Moco Monkey Grip Tire Patch has had a wonderful sale. The manufacturers say it has been recognized by the government as a standard tube repair method and is being used for repairing punctures, blowouts and holes in tubes in practically all the cantonments, and that it was adopted after tests had been made of 67 cold patches and tube repair methods.

Manufactured by the Moco Laboratories, Oklahoma City, Okla., and Mt. Vernon, Ill. Distributed by Farley & MacNeill, 105-107 Federal St., Boston, Mass., in northeastern states, the firm being sole distributor in New York, New Jersey and New England. Prices: Small size can, 3x18 sheet, $1; large size can, 6x18 sheet, $1.75; casing patch, 6x18 sheet, $1.75.

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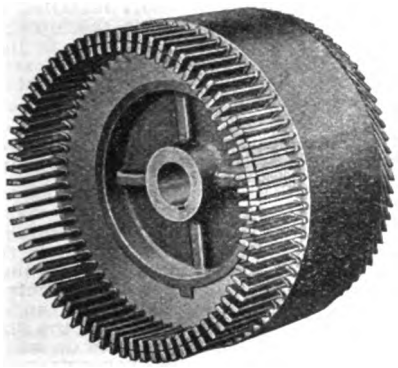
Dayton Electric Starting, Lighting and Ignition System for Ford Cars. It is possible to connect this equipment direct to the crankshaft because of the type armature of the motor dynamo, which is an entirely new construction recently invented by Vincent G. Apple.



Motor-Dynamo mounted on Ford Car

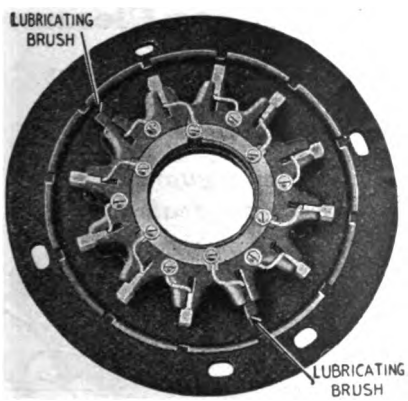
There is no cotton insulated wire used in its construction, the windings being made with flat copper strips cut to length and formed into hairpin loops, which are inserted through a number of laminated iron discs.

These are then bent into shape by a



Hair Pins Shaped to weld on Commutator

special machine to make them uniform, leaving the flat ends to weld to the commutator segments. This is done with an electric welder which makes the commutator a part of the winding, thus preventing open circuits. After the armature is assembled it is impregnated with a bake-



Commutator Brush Assembly

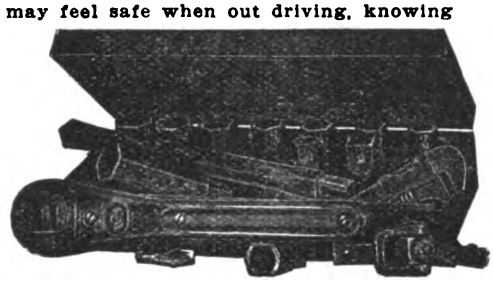
lite and baked, which makes it a solid, homogeneous mass impervious to oil or water and not influenced by temperature. This armature can be shaped to fit frame of any low voltage dynamo using the same sturdy construction.

The field frame of the motor dynamo is made of semi-steel and has 12 field poles in which the armature rotates to generate the electric current. The brush assembly is on the back of the motor dynamo front plate. Instead of using two large brushes to carry the starting current, the brushes are in 12 parts to give the "finger" action so desirable for commutator brushes. The starting switch and automatic cut-out is a combined unit.

One of the illustrations shows the hair pins shaped to weld on the commutator, another the commutator brush assembly, and the third the motor dynamo mounted on Ford car.

Manufactured by the Dayton Electrical Manufacturing Co., Dayton, O. Write for literature and prices.

Mossberg "Major" Set. Owners of Ford automobiles will appreciate the Mossberg "Major" wrench set. In it are tools for making all adjustments of Ford chassis, including reversible ratchet handle. With this set the Ford driver may feel safe when out driving, knowing



that he is prepared for almost any work of repair or adjustment that may be required.

Manufactured by Frank Mossberg Co., Attleboro, Mass. Prices quoted on request.

Standard Fuel Saver and Decarbonizer. This equipment created much interest at the New York show, resulting in big orders for this and foreign countries. It is so constructed that it can be installed on any car in a short time. Its main feature is the use of an atomizer. A pipe connection leads from the device to the intake manifold of the machine. The natural operation of the engine causes vacuum, which results in the operation of atomizing diaphrams.

The atomizer produces a very thick and finely divided water vapor that is drawn with the fuel into the intake manifold of the engine and thence into the cylinders. Owing to a much richer charge of oxygen in the fuel mixture the gas burns completely and leaves no carbon. For this reason the car owner gets more power with less gasoline consumption. The rich vapor introduced into the cylinders with the fuel is converted instantly into superheated steam. This eliminates carbon, which is ejected to the exhaust pipe.

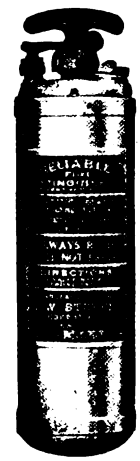
This cool vapor also reduces the volume of the warm gas mixture from the



carburetor and forms a more condensed charge in the cylinders and, consequently, more power is generated.

Tests made by Joseph Tracy, consulting automobile engineer, at the request and for the account of the United States Fuel Administrator, showed a 34¾ per cent. saving of gasoline on the bench tests.

Manufactured by Motor Fuel Saver Corporation, 50 Church St., New York City. Price, $15.



The Reliable Fire Extinguisher is adapted for use in all kinds of fires where the quick use of an extinguisher prevents great loss. It is simple in operation and is a non-conductor. The maker asserts that it will not explode or corrode and will throw a stream 30 feet. Its adaptability under all circumstances makes it efficient for extinguishing acetylene, electrical, gasoline, naphtha, oils and varnish fires in either private homes, factories, stores, warehouses, automobiles and motor boats. The extinguishers are made of hard brass in four sizes, as follows: Baby size, one pint, $7; auto size, two pints, $8; motor boat size, three pints, $8; large size, six pints, $12.

Manufactured by J. W. Stevens, Rosebank, N. Y., and distributed by Charles D. Durkee & Co., 2 and 3 South St., New York City. Price quoted at request.

G-P Pedal. The G-P Pedal is made entirely of steel and is strong enough to operate any cut-out spring. It is so designed that by releasing one screw it can be changed to lift or pull in any direction desired. Geared compound leverage makes



G-P Pedal

it easy to operate. This is of particular importance to the motorist, especially when the pedal has to be placed in an awkward position where it is hard to reach. The locking device is on the bottom plate. Thus the pedal can be fastened to a steel or wood floor board of any thickness without altering its throw. It travels in a straight line and needs but one round hole drilled in the floor board.

Compounding of the leverage and geared parts gives a longer throw and requires less space for installation than other types of pedals.

Edward A. Cassidy Co., Inc., Madison Ave. at 40th St., New York, N. Y. Price, $1.50.

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Cadmium Test Set. You may have made tests of batteries that have seemed to be reliable, but do you realize that even though voltage or gravity may be satisfactory, yet the battery capacity may be low? The reason for this is that either the positive or negative plates may not be charging or discharging properly. The

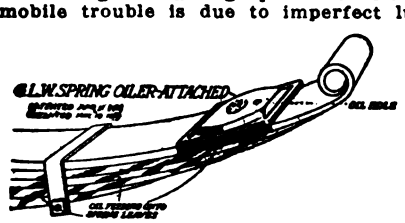


result will be that the voltage will fall rapidly during discharge and the capacity of your battery will be greatly reduced.

A test by means of the use of cadmium can be made of each plate, separately, to determine their condition. The efficiency of this test has created such a demand for a means of conducting it easily that the American Bureau of Engineering, Chicago, has devised the cadmium testing set illustrated herewith. It consists of two leads of insulated wires, five feet long, attached to two wooden handled brass prods. On one of these prods is attached a piece of cadmium with a rubber tip. This set can be used either with the Ambu Trouble Shooter or with an ordinary voltmeter if finely calibrated.

American Bureau of Engineering, Inc., Battery Division, 1018 S. Wabash Ave., Chicago, Ill. Price, together with full instructions, $3 f. o. b. Chicago. Shipping weight one pound.

The G. L. W. Automatic Spring Oilers consist of a high grade felt pad with an oil reservoir, contained in a rust proof polished blue metal case. This case snaps over the main leaf of the spring and is so constructed that different degrees of pressure is brought to bear on the felt pad, making the ends perfectly tight and oil proof, thus keeping the top surface of the main spring perfectly clean. At the sides the pressure on the felt is such that it permits a very slow seepage of oil, which fills the grooves along the entire side and is carried between the leaves by capillary action. Engineers are universally conceding that a large per cent. of automobile trouble is due to imperfect lu-



brication of spring and modern machines are being fitted with spring lubricating systems. This being the case, it is therefore practical that every operator fit his automobile spring sets with some sort of spring lubricating device. The manufacturers of this accessory allow a 30 days trial, with money refunded, if not satisfactory, and in addition to this make a sweeping guarantee to replace any spring on any automobile, if broken after a set of G. L. W. automatic spring oilers has been in use on the car springs three days.

Marketed by the Hudson Sales Co., factory branch G. L. W. Spring Oiler Co., 7 East Jackson boulevard, Chicago, Ill. Price 20 cents each.



The General Tire. Every ounce of rubber, every inch of fabric for the General Tire is selected and tested for quality. Every measurement is true to the thousandth of an inch.

Three groups of General tires are made —the General Cord Tire, the General Fabric Tire and the General Jumbo Tire.

The General Cord Tire has made a most enviable reputation for itself. The General Fabric Tire is the tire that made its manufacturer famous. The General Jumbo Tire is the oversize for Fords, Chevrolets and other light pleasure cars, with 30x3½ rims. It has the big air space of a 31x4.

Manufactured by the General Tire and Rubber Co., Akron, O. Prices quoted on request.

The Conaphore is a solution of the headlight problem, which adds to the bulb and the reflector a third part. The function of the Conaphore is to direct the rays of light from the bulb and the reflector so that the beam will have a long range, will not glare and will pierce fog or dust.



The Conaphore is an entirely new scientific headlight glass. It is the result of three years of experimentation. It is unlike any no-glare lens or dimmer device. Both design and material are new inventions and are fully protected by patents.

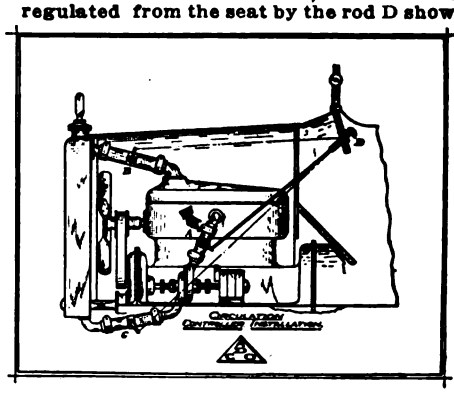
The Conaphore has a smooth outer surface and a series of patented horizontal corrugations on the inner face. These corrugations bend down the light rays and shoot them out in a long, intense beam.

The Conaphore is made of Noviol Glass (a patented yellow tint glass) which absorbs the blue and violet rays. The beam of light transmitted by this glass eliminates back glare and penetrates fog or dust.

Manufactured by the Corning Glass Works, West Corning, N. Y. Prices, $1.30 to $4 per pair.

Temperature Control for All Cars. Realizing the necessity of controlling the temperature of an engine to obtain proper operation and economical running of automobiles, trucks and tractors, particularly with the lower grades of fuel that have to be used, the Automotive Devices Co. has marketed a neat and efficient device for controlling the circulation of the water to regulate the temperature of the engine.

It permits the motor to reach 150 degrees temperature in two minutes after starting, because only the water within the motor has to be heated, and it can be regulated from the seat by the rod D shown



in illustration to control the temperature to any desirable degree regardless of atmospheric conditions.

Its use in conjunction with a motometer is ideal. The motometer indicates the temperature and the controller regulates the circulation in accordance with desire.

The controller is easily installed on any car. It may be placed in the hose pipe in positions A B or C, as shown in illustration, the rod leading to the instrument board at D. It is necessary to state the inside diameter of the water hose when ordering.

Manufactured by the Automotive Devices Co., 98-102 Randolph St., Detroit, Mich. Price, $5.

Wonder-Mist is used with a spray when cleaning automobiles. It cleans the car of all dust, mud and grease, without water and without danger of scratching. The sprayer application is simple and easy. Wonder-Mist does not injure the finish. It contains no acid, alkali, gum or wax. It is non-combustible and non-poisonous. It feeds the finish, keeps it flexible and lustrous under all conditions. Its protecting film prevents rain streaking, mud spotting and dullness.

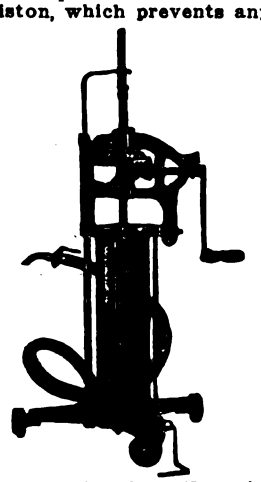


Soap and water ruin a car's finish. Car washing is a dirty, disagreeable drudgery when done in the old way, but it is made simple when done with Wonder-Mist.

Made by the Wonder-Mist Manufacturing Co., 300 Washington St., Boston, Mass. List prices: Gallon can, $3; ½ gallon, $1.75; quart, $1; pint, 60 cents; ½ pint, 35 cents; sprayers, 50 cents each.

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The Ekern Portable Garage Grease Gun consists of a heavy seamless steel cylinder mounted on three wheels, having five feet of hose attached to the bottom of the cylinder, with shut off valve and nozzle at the end of hose. It registers and measures accurately the amount of grease put in the gear case or differential, and will work equally well on liquid oil as well as hard grease. It is equipped with two sets of gears. When the crank is pushed in it disengages the low gear and immediately engages the high gear, which operates the piston either up or down at high speed. The cylinder is 20 inches long by six inches in diameter, capacity 20 pounds of grease or 2½ gallons of oil. The piston is covered with best quality cup shaped leather and is provided with an expansion ring in piston, which prevents any grease



or oil from leaking by. The piston also has an automatic air vent, which releases the vacuum in the cylinder when cranking the piston up for refilling. The base is provided with a step lock which lifts the castor up off the floor and sets the gun rigidly while cranking.

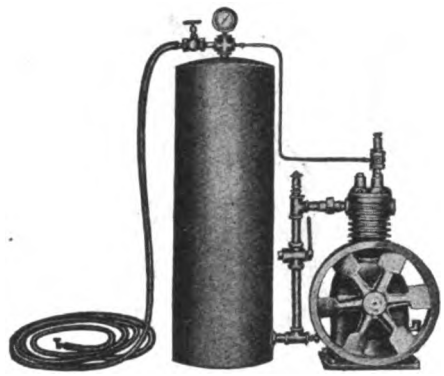
Manufactured by H. G. Paro, 1410-12-14 S. Michigan Boulevard, Chicago, Ill. Price, $47.50.

Tasgon. This is known as "The Magic Fluid of Many Uses." A few drops of this fluid will loosen rusty nuts, bolts and connections of all kinds. It finds a ready welcome in garages and service stations, and with automobile and motor boat repair men and automobile owners. Tasgon loosens the rust scale, lubricates the parts and makes disconnections easy. Fittings that are rusted, corroded or otherwise stuck can be easily removed by it. Tas-



gon will not injure metal. Tasgon is especially valuable for trucks and tractors, as it will prevent laying up the truck or tractor for repairs, also delay in waiting for new parts. Tasgon saves the old parts. A can of this in the tool kit is very valuable. Tasgon prevents carbon from collecting, stops squeaks in springs and starts a cold motor.

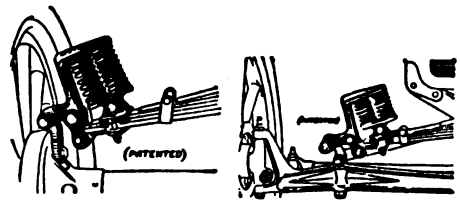
Manufactured by Samuel Cabot, Inc., Boston, Mass. Distributed by Polygon Products Co., 141 Milk St., Boston, Mass. Price: Half pint, nozzle top, 60 cents; pint, $1. Also sold in quarts and gallons.



New Style "S" Curtis Outfit. This includes an air compressor with hand unloader and tight pulley, welded steel pressure tank with air gauge, drain cock and pop safety valve. The piping between compressor and tank is made specially substantial and of convenient patterns to save floor space and prevent breakdowns and trouble. It has an outlet cock made in five different sizes, up to the usual Curtis standard of excellence, and is ideal for those seeking a complete outfit at a minimum outlay, for it will deliver more air than some portable machines that cost from two to three times as much.

Manufactured by the Curtis Pneumatic Machinery Co., St. Louis, Mo. Write for booklet and prices.

Champion Shock Absorbers for Ford Cars. The "Champion" is a new spring suspension which absorbs the jar and rebound. It is fast becoming popular with Ford owners, as it does with great efficiency the work for which it is designed. It is simply attached. The centrifugal forces throw the jars on the absorbing device, which simultaneously accomplishes



the shock absorbing task by the pivoted bearing allowing free rolling oscillation in control by two coil springs. The free semi-rotary motion for the absorber construction is an important feature. The device is directly attached to the automobile wheel. The illustrations show front and rear absorbers.

Manufactured by the Champion Shock Absorber Sales Co., 918 North Senate Ave., Indianapolis, Ind. Price quoted on request.

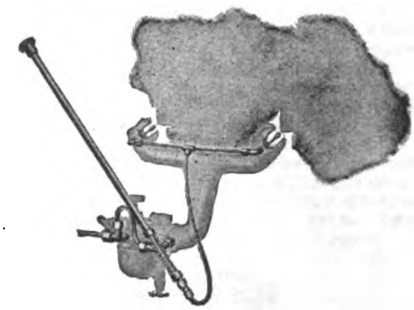
Rim and Gasket Shellac, a Norwesco specialty, is a refined product of the highest quality and will give the best results with gasket joints. It should be applied generously to both surfaces, great care being taken to see that the gasket surfaces and edges are perfectly coated. It is particularly useful on engines which have removable cylinder heads. It dries quickly and seals the joint perfectly.

Manufactured by the Northwestern Chemical Co., Marietta, O. Price, two-ounce swab bottle, 20 cents; half pint cans, 50 cents; pint cans, 75 cents; quart cans, $1.25; gallon cans, $4.



Liberty Starting Primer. This may be installed on any Ford car, truck or tractor. It does not interfere with any part of the motor or dash, The primer is guaranteed to turn over the motor by combustion in each cylinder in rotation on the first turn of the engine by hand crank or by any starter at any temperature to 20 degrees below zero. It is a fuel and battery saver, as it obviates running the engine unnecessarily. It saves the batteries from extra starting work. The primer prevents the engine stalling when on a grade.

Vaporization is produced by a quick thrust on a push button on the dash. This operates a high pressure force pump, throwing the fuel, gasoline, kerosene or distillate, through a patented atomizing nozzle with such force that the manifold and ports are filled with suspended vapor-



ized molecules of fuel of highest combustibility.

In ordering if car is not equipped with a standard Ford carburetor or manifold, it is necessary to specify name of the carburetor and manifold.

Manufactured and distributed by the Liberty Primer Co., Inc., 676 Woodward Ave., Detroit, Mich. Price, $8 complete; installed, $9.50.

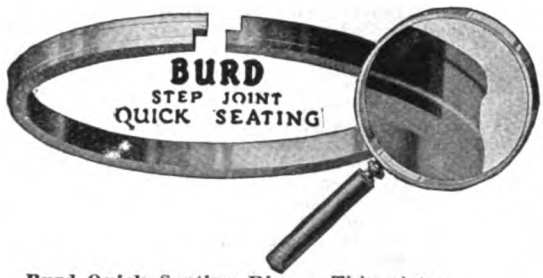
Kenworth Men's Overalls. These are very suitable for the mechanic working in the garage or service station. The famous "Governor Fastener" is an attachment at the bottom of the legs which has been approved by the safety engineers of a number of the largest plants in the country. Kenworth Overalls are made for service and safety. All strain points are reinforced, the seams are strongly stitched



and the button holes are well made. They have riveted buttons. There are eight serviceable pockets. The material is the best blue denim, khaki, Stifel stripe and white drill. The workmanship is excellent. The Kenworth products include one-piece suits, bib overalls.

Made by the Kenilworth Manufacturing Co., Inc., 7 East 17th St., New York City. Write for literature and prices.

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Burd Quick Seating Rings. This piston ring is made expressly for replacement work. The rings are individually cast and ground—not turned—and the surfaces channeled. It is a quality ring for old motors which gives results immediately. There is now slow process of wearing down to a proper seat. Repair men and dealers in general are bound to be especially interested in these rings.

The Arrow Specialty Co., 16 West 61st St., New York City. Write for prices and literature.

Leather and Pantasote Top and Upholstery Dressing, a Norwesco specialty, makes tops look and wear like new. It waterproofs and preserves the material and gives a desirable egg shell, flat black finish of great durability. It is very elas-



tic and does not chip or flake. It is excellent for upholstery, renewing the finish and improving the wearing qualities of the material. It will not rub off on the clothes. The dressing is easy to apply. It dries quickly, leaving an even, uniform surface, free from brush marks.

Manufactured by the Northwestern Chemical Co., Marietta, O. Price, pint cans, 75 cents; quart cans, $1.25.

Utility Black. This is a Norwesco specialty that is just the thing for touching up scratches or places where the enamel has chipped off fenders, body, lamps, engine, hood, radiator or any other painted part of the car. Utility Black is easy to apply and dries hard and glossy in one



hour. When used on the engine the heat bakes the finish, producing a hard surface easily kept clean.

Manufactured by the Northwestern Chemical Co., Marietta, O. Price, half pint cans, 60 cents; pint cans, $1.

Gastine. This is a gasoline economizer and is designed to prevent the formation of carbon and reduce upkeep expenses. It works on the principle that "an ounce of prevention is worth more than a pound of cure." Gastine is a highly concentrated composition of volatile and essential oils of well known solvent qualities, compressed into tablet form, readily dissolving in gasoline and takes immediate action on the gasoline.

It is sold under guarantee not to contain anything in its composition that is in any way injurious or detrimental to any metal or to the finest mechanism of any motor, carburetor or a vacuum feed system, any more so than good gasoline would be.

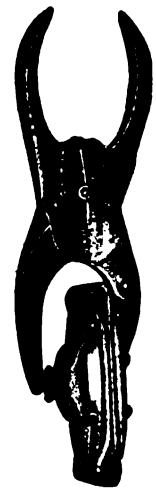
Gastine has been indorsed by the National Ford Owners' Club of New York City.

Made by the Gastine Co., Bridgeton, N. J. Price, 100 tablets, $1.



The Tong-Em-On Vulcanizer consists of a nickel plated vulcanizing tong, two copper pans—puncture and blow out sizes—and one dozen "Risk's Riskless" perforated fuses and patches.

To use, simply roughen the surface of the tube thoroughly, peel off one of the gum patches from the stack and stick it to the bottom of pan. Remove the cloth

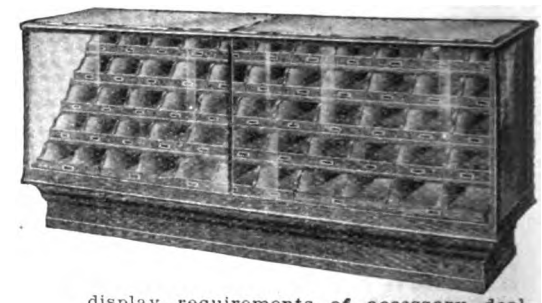


and pull the tong tight, sliding the floating rivet back in slot to hold tong closed. Put two of the patented fuses into the pan and light with a match. The whole process requires but five minutes time and the makers claim a permanent repair is the result.

Manufactured by the Tong-Em-On Vulcanizer Co., 626 Plymouth Building, Minneapolis, Minn. Price, $1.75.

Special Accessory Show Case. Always has it been a question among accessory dealers to know just how to properly display their merchandise. There is no doubt about the productiveness of good display cases. It has been demonstrated in practically every other retail business, but for some reason or other accessory dealers have not, as a general thing, considered the matter so seriously. But if it is beneficial to attractively display cigars or socks, for example, surely it must be the logical thing for dealers to do.

It is said that 80 per cent. of all retail sales are the result of displays. In recognition of this fact, the Detroit Show Case Co. made a thorough investigation of the



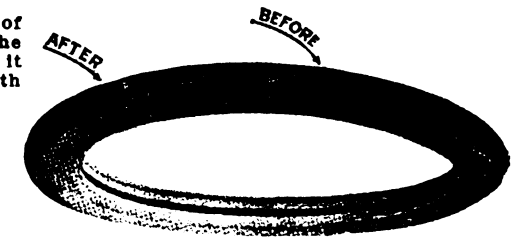
display requirements of accessory dealers and as a result designed the case shown here.

It contains from 35 to 70 drawers of various sizes, the number depending upon the length of the case. A few of the larger drawers have removable partitions for the display of larger articles.

This case is not only attractive, but it helps to keep the stock clean, bright and fresh and makes it easy to keep a close watch on it. Each drawer has a bronze pull and card holder. Dealers who now use this case recommend it highly.

Manufactured by Detroit Show Case Co., Detroit, Mich. Write for literature and prices.

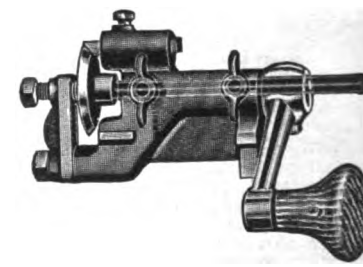
Treado is a prepared rubber for mending tires and rebuilding worn treads, fills small and large cuts, forming a durable rubber tread. It requires no experience to apply and dries in from 10 to 15 hours. It is also used for mending leaky rubbers, rubber boots, rubber soles and heels



and will resole or repair leather and fiber soles. The cut to be repaired is first cleaned with gasoline and roughened with a knife and the Treado is spread into the opening with a knife, making a permanent repair.

Manufactured by the Treado Manufacturing Co., 42 Dwight St., Springfield, Mass. Prices for tires, 50 cents a can. Leather, 50 cents a can. Rubbers, 40 cents a can.

Sioux Valve Refacing Tool. This removes all carbon pits and other irregularities from the valve face. It makes the face at an accurate angle and perfectly centered. It does for the valve, in a few minutes, what takes hours of work by old methods. The construction and operation is simple. The cutter is made of the best kind of tungsten steel, hardened and tempered to stand hard service. It locks into



a vise and can be made ready for use in an instant.

Manufactured by Albertson & Co., Sioux City, Ia. Price, No. 304 complete with 45-degree cutter, $6.

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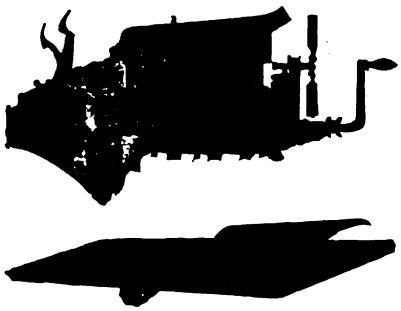
Pedex, a pedal extension device, makes it possible for two persons of different height to drive the same car with equal comfort. Pedex is designed to be attached to both the brake and clutch pedals, and the use of the permanent pedals is in no way impaired. Two adjustments are possible, so that the foot may be placed in a



position of greatest comfort. In touring this article is a great help to the driver, making it possible for him to rest his feet by shifting to a new position.

Manufactured by American Car Accessories Co., 529 West 21st St., New York, N. Y. Price, $5 per pair.

Safety Oiling System for Ford Motors This system is designed to eliminate all foreign matter from the oil, prevent chattering on low speeds and when using foot brake and stop wear on transmission linings. It cools the oil, because the pipe which carried oil to front of motor is out-



side. It sends a stream of oil on the transmission and brake bands and keeps the flow of oil to capacity of pipe at all speeds.

By disconnecting the pipe at the bottom of crank case one can tell instantly if it is working. The system is said to keep up oil circulation on half the quantity by regular system, even on the steepest hills.

Patented and manufactured by Chas. Kralicek & Co., Cleveland, O. Distributed by the M. & M. Co., 500 Prospect Ave., Cleveland, O. Price, $5.

Tarr-Gon. This is a tar and asphalt remover for automobiles. It quickly removes tar, asphalt, grease and stains from bodies, mudguards and tires, making them look like new. It cleans, brightens and



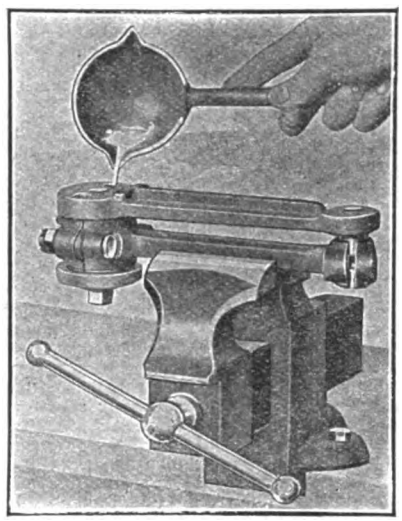
preserves leather cushions, straps and tops, linoleum, rubber and metal running boards. It cleans windshields, headlights and reflectors.

Tarr-Gon will remove tar and grease from carpets, rugs, upholstery, shoes, clothing, metals, etc. It dries quickly and collects no dust. Spots and splashes of road oil and asphalt have ruined the costly finish of thousands of automobiles. They can be readily removed with Tarr-Gon without damage to the finish, fabric or texture. Even spots that are ground in, mud freckles and surface scratches that appear to be permanent, will disappear with Tarr-Gon.

Made by Samuel Cabot, Inc., Boston, Mass. Distributed by Polygon Products Co., 141 Milk St., Boston, Mass. Prices: Half pint size, 60 cents; quart sizes, $1.50.

Tribune Babbitting Jig for Ford Connecting Rods. Every progressive dealer has many calls for Ford connecting rods to replace those with worn bearings. Every time you "scrap" a Ford connecting rod because it has a burned or worn bearing, you throw away a dollar or two. The Tribune Ford Connecting Rod Babbitting Jig in the hands of the average mechanic will rebabbitt four or five rods an hour. A little time, a few cents worth of babbitt, and the job is done.

In the Tribune there is a plug at the lower end, which represents the crankshaft, and the casting is machined to accurately cast a bearing exactly of the proper dimensions. At the upper end of



the casting there is a plug which represents the piston pin just as it is in the motor. Nothing is left to the eye or guess. As rods vary in length this piston pin plug has a nut on the bottom and the hole is large enough to permit it being moved lengthwise. The nut and thread on the pin are not shown in the illustration.

This is the way it works: Remove cap on large plug. Slip rod over both plugs. Extend shims so rod is centered sideways. If necessary, move small plug to center rod lengthwise. Replace cap, pour bearing. It must be accurate, both ends of the rods being held as in the motor.

Manufactured by the Tribune Engineering Co., Inc., Owego, Tioga Co., N. Y. Price, complete tool, $1.50. Special babbit for Ford rods can be supplied. Write for price.

New York Automatic Headlight Controller for Ford cars eliminates trouble of varying light given by the car headlights. The Rear Light Controller consists of an arm which is attached by means of a stud to the base of the device. To the lower end of the swinging arm is attached an aluminum disc, which when in position on the engine is about eight inches back of the fan. The base is fitted with three contacts, over which the swinging arm travels. When the engine is started the arm, by spring tension, is brought to the first contact and only the left headlight receives current. The total current from the magneto is sufficient to illumine this single headlight to its full candle power. As the engine speeds up the air current, acting on the swinging arm disc, carries it to the second contact and both bulbs receive current. Should the engine speed increase still further the arm would contact with the third connection and a resistance coil



introduced into the circuit, preventing the burning out of the lights from excessive current.

Manufactured by New York Coil Co., 338 Pearl St., New York, N. Y. Price, $5 complete with wiring.

National Spark Plugs are designed especially to meet the demand for an efficient spark plug, with big spark power electrodes that will ignite low grade fuel satisfactorily. The patented one-inch firing surface gives seven to 10 hot, fat sparks, so powerful and intensely hot that they will ignite the fuel instantly. Carbon troubles are practically eliminated and there is a great economy of fuel.

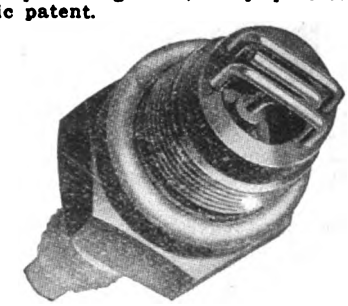
The heavy firing wires are designed to give satisfactory service for all heavy duty requirements of air, land and water service. A recent test of National spark plugs by one of the largest oil producing companies in the United States, demonstrated that the National was the only spark plug that "stood up" under the



heavy duty requirements of a Casinghead engine. As a result of this test this spark plug was adopted exclusively for use in all its plants throughout the United States.

After rigid competitive tests by ignition experts National spark plugs have been selected for use in marine motors, aeroplanes, automobiles, trucks, tractors and stationary engines.

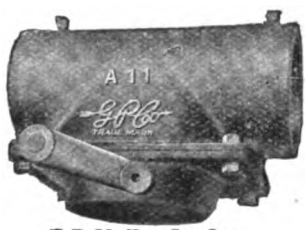
National spark plugs are entirely different from any other type of spark plug and are constructed on an entirely new principle of ignition, fully protected by basic patent.



Manufactured by the Bergie National Spark Plug Co., Rockford, Ill., which will mail to any motor user a copy of the interesting folder "Big Power Spark Plugs" and descriptive literature with prices.

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The G-P Muffler Cut-Out is practically designed. The valve tongue and its seat are so constructed that when the cut-out is open the line to the muffler is completely shut off and correct angle is obtained for deflecting the exhaust gases freely without possibility of back pressure. The G-P Muffler Cut-Out is made in two parts, affording quick access to its interior. When the cut-out is closed the pressure of the exhaust gases cannot open it. The course which the exhaust gases must take tends to prevent carbon accumulation on



G-P Muffler Cut-Out

the valve or its seat. The area of the sections in every part of the cut-out is greater than any section of the exhaust pipe line; therefore, the relief of the motor is complete and the volume of sound intensified. The G-P Muffler Cut-Out is attached without flanges. The ends are bored to the exact size of the exhaust pipe, with shoulders at each end. A set screw prevents shifting and insures rigidity. Each G-P Muffler Cut-Out is packed in a substantial wooden box, which makes attractive shelf or window display.

Manufactured by G. Piel Co., Inc., Long Island City, L. I. Sales department, Edward A. Cassidy Co., Inc., New York City.

Se-Ment-Ol Liquid, a product which will add greatly to the convenience of the motorist, has been placed in the market by the Northwestern Chemical Co., Marietta, O., maker of Norwesco "chemically correct" automotive equipment.

Se-Ment-Ol Liquid contains all the chemical properties of the original powder form, known to 2,000,000 motorists as the radiator cement that "finds the leak and fixes it."

The motorist pours Se-Ment-Ol Liquid into his radiator and drives on, losing no time from business or pleasure, as it is not necessary to lay up the car to allow the repair to set or harden.

The water in circulating through the cooling system carries Se-Ment-Ol to the



leak and on coming in contact with the air it congeals and is hardened by the heat from the motor forming an elastic repair which cannot be destroyed by the action of the water or the vibration of the car.

It is not necessary to drain the radiator, as Se-Ment-Ol Liquid is absolutely harmless, and if allowed to remain in the cooling system will automatically repair any new leaks that may develop. Tiny leaks are often hard to find and are usually in places where soldering is very difficult.

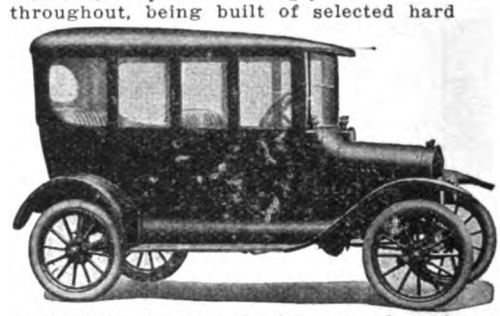
Se-Ment-Ol Liquid not only saves time, but it cuts repair bills. A 75 cent can will repair a radiator holding six gallons of water.

Manufactured by the Northwestern Chemical Co., Marietta, O. Write for literature and prices.

Anchor Demountable Glass Enclosed Tops. Are made for Buick, Overland, Oakland, Dodge, Oldsmobile and Ford cars. The illustration shows the one for Ford touring cars. They add to the comfort and convenience the year around. Anchor Tops are designed to meet the demands of the motoring public for an attractive and well built demountable top that can be applied to the regular touring or roadster body of various standard cars and instantly convert them into comfortable, good looking sedans or coupes. Every motorist is aware of the inconvenience of celluloid curtains that are regularly furnished with his car. Stormy weather is the very time that a car is needed most.

The Anchor glass walls protect from the cold blasts of winter and from exposure to the fall and spring rains. During the summer the sides may be completely removed and a set of curtains used, or for those enjoying motoring with the top down, the Anchor Top has an added feature in that it may be readily lifted off and the touring top again applied.

Anchor Tops are strongly constructed throughout, being built of selected hard

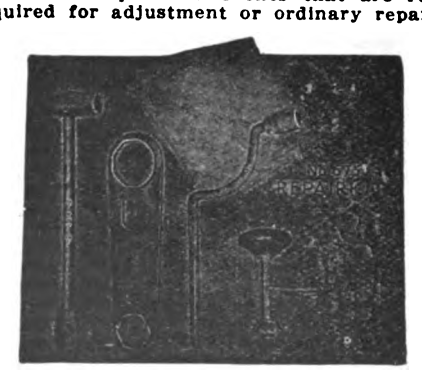


wood stock, reinforced with pressed steel. The rigid deck and frame of these tops are covered with a high grade luster lasting water proof material, while the sides, including all windows and door sections, are highly finished wood surfaces. Windows throughout are of extra heavy crystal glass. Windows of doors are arranged so that the upper or outer pane slides in a felt lined steel channel, and thus can be raised or lowered as desired.

Special fasteners hold this glass in position desired, thus overcoming possibility of rattle or breakage. Doors open widely, affording easy entrance and exit. An electric dome light furnishes interior illumination, but this feature is not furnished on Ford tops. Anchor Tops are easily installed. Models not listed are made to order.

Made by the Anchor Top and Body Co., Cincinnati, O. Write for literature and prices.

Ford Repairkit. This repairkit combines the special wrenches that are required for adjustment or ordinary repair



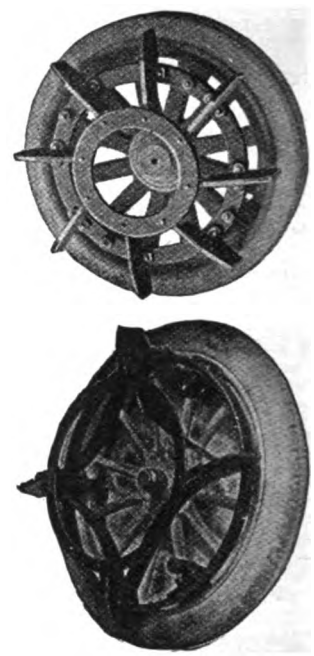
of any light passenger car, but they are intended especially for use on Ford chassis. Wrenches are exceptionally well made.

Manufactured by Frank Mossberg Co., Attleboro, Mass. Write for prices.

American Traction Rings. The need of equipment that will insure traction for motor vehicles on ice, snow or mud covered roads, or on soft surfaces, has long been recognized. The American Traction Ring meets this need. It is simple in construction and positive in results, yet economical in price.

The ring is fastened to the outside of each of the driving wheels. To these rings are attached eight blades, more commonly called "paddles." These blades are set at an angle of 15 degrees so that they may exert the proper pressure, as they come into action below the horizontal hub line. The blades are also fastened to an outside guard ring, the complete device being attached to the wheel by means of bolts fastened to a ring on the inside of the wheel.

The blades do not come in contact with hard road surfaces, and only when the wheels sink into snow, ice, sand, soil or mud do the blades take up the work. Even



though a truck should become deeply mired, a plank, rail or heavy chain placed under the blades will give the traction necessary to lift the truck from almost any hole. The device is sold with a liberal guarantee.

Manufactured by the American Traction Ring Co., Inc., White Plains, N. Y. Prices on request.

Security Auto Lock for Fords. This lock makes a Ford car "thief proof." So many automobiles are being stolen every day that the car owner who goes without protection assumes a big risk. With the Security Auto Lock guarding a Ford the



car cannot even be towed away. Insurance companies recognize the protection given by this lock, and they make a liberal reduction in insurance rates to car owners who use it.

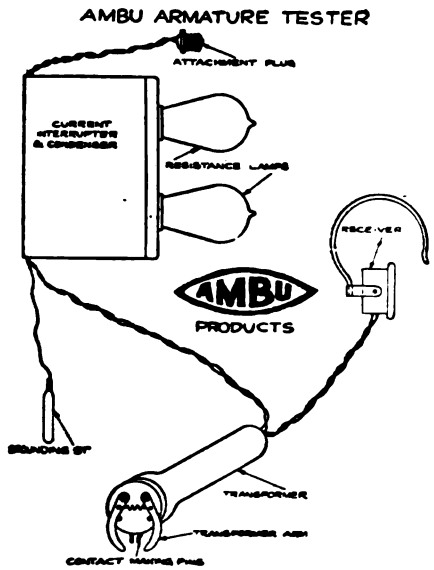
Distributed in New England by Farley & McNeill, 105-107 Federal St., Boston, Mass. Price, $6.

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Ambu Armature Tester. The Ambu Armature Tester is a patented device for quickly detecting and accurately locating open circuits, short circuits, grounds and reversed commutator connections in the armatures of motors and generators equipped with commutators.

It combines the good features of the ordinary test methods, i. e., the drop of potential method, the telephone receiver test and the "growler" or transformer test. An alternating or interrupted direct current is used for testing. Not more than one ampere is required for testing any armature, no matter how high or low the resistance of the windings may be.

This current is sent into each consecutive pair of segments, by means of two test points. Two contact making arms touch the commutator at two segments, which are at equal distances from the segments at which the current is sent in. These arms lead to the primary of a specially designed transformer coil, the secondary of which is connected to a specially wound head band telephone re-

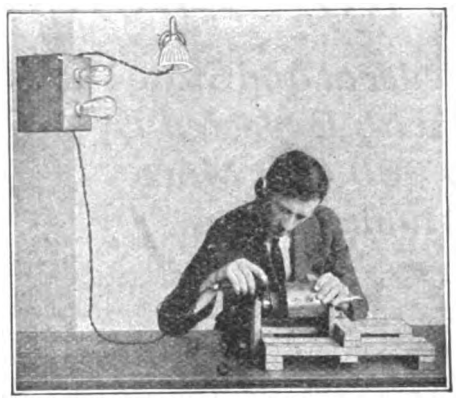


ceiver. By this method each coil is automatically tested against several adjacent coils, all test indications therefore being comparative. Any slight variation in the resistance of each coil is indicated by a change in the sound heard in the receiver. The transformer coil causes a very marked difference in the sound for a very slight change in resistance.

No connections are made to the commutator. All testing is easily performed with one hand. No current flows through the tester until the two contact making pins are touching consecutive segments. The entire tester weighs less than seven pounds and is therefore entirely portable.

An open circuit is indicated by a sudden and very marked increase in the loudness of the tone heard in the receiver. A short circuit is indicated by an equally marked decrease in the tone heard in the receiver. Reversed connections to the commutator are indicated by a loud tone on every second pair of segments as long as the reversed connections continue. In testing for grounds current is sent into the commutator through only one segment at a time and leaves through the core or short. When the current is sent in at the segment which is nearest the ground, the tone heard in the receiver will be very dim. In every kind of trouble, i. e., open circuit, short circuit, ground and reversed connections, the tester picks out the segments or pair of segments nearest the fault.

The Ambu armature tester may be used on any direct or alternating current supply circuit having a voltage of from six to 220 by varying the size of two resistance lamps connected in series with supply circuit, or by short circuiting the lamps, as the case may be. The maximum current taken from the supply circuit in testing



any armature does not exceed one ampere. With this current armatures having very low resistances are easily, quickly and thoroughly tested. Armatures of moderate or high resistances require one-half ampere of test current.

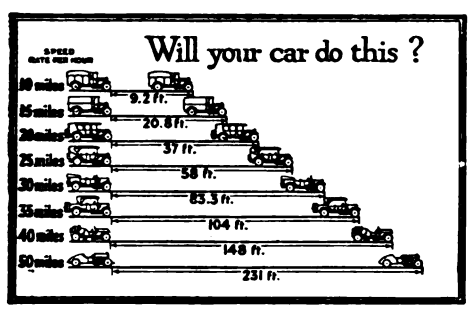
As shown in the illustrations, the construction of the Ambu Armature Tester is exceedingly simple. The two contact making pins by which current is sent into the armature, the two curved arms leading to the transformer coil, and the transformer coil itself are all included in one part, as shown in the first illustration. The current interrupter, condenser and resistance lamps are contained in a small box. The several parts are interconnected by duplex flexible wire.

In making a test, an attachment plug is screwed into any lamp socket. The receiver is then adjusted to the ear. The tester head, containing the contact making pins, curved arms and transformer coil is grasped in either hand, as shown at "C" in the second illustration. The two contacts are then brought down on each consecutive pair of segments around the entire armature, the variation in the tone heard in the receiver indicating the nature and location of the trouble.

Manufactured by the American Bureau of Engineering, 1018-24 South Wabash Ave., Chicago, Ill. Price complete, $30 f. o. b. Chicago.

Thermoid Hydraulic Compressed Brake Lining. How quickly can you stop—not how fast you are going—determines your safety when motoring. The chart illustrated shows how quickly your cars should stop if the brakes are safe and sure. The safety of the car and the security of everyone who rides in it depends upon the texture of the brake lining.

The maker points out that in every square inch of Thermoid brake lining there is 40 per cent. more material than in ordinary woven lining. This additional body gives a closer texture which is made tight and compact by hydraulic compression under 2000 pounds pressure. In ad-



dition, Thermoid is "grapnalized," an exclusive process in manufacture which enables it to resist moisture, oil and gasoline.

The engineers of 47 cars and trucks have standardized on Thermoid Hydraulic Compressed Brake Lining.

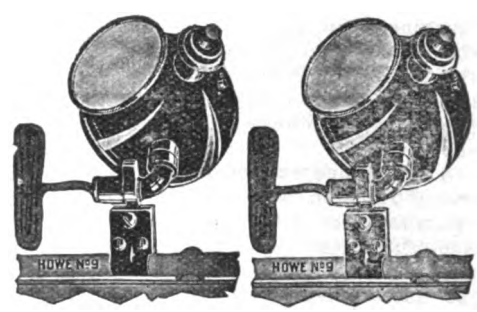
Manufactured by the Thermoid Rubber Co., Trenton, N. J. Prices quoted on request.

Howe Searchlight. The new models of Howe searchlights are sure to please. They have an enclosed water proof switch and a simple, positive, exterior focusing device, making the Howe one of most complete searchlights on the market.

The Howe directs as easily as pointing a finger, and "stays put" wherever it is turned. This is accomplished by use of a spring controlled bracket, a patented feature. With one hand a person can control the powerful penetrating beam, throw it to the right or left, up, down, behind him, or any other place, instantly.

Both joints in the Howe bracket move at the same time. Two coil springs hold the turning joints in a firm, even grip, and they take up all loose motion and wear. The Howe Searchlight never becomes loose or wobbly, regardless of jars or vibration, no matter how long it is used.

The hollow bracket protects the wire, prevents wear and short circuits. The parabolic, heavy silver plate reflector gives a true spotlight at all distances.



The searchlights are finished in handsomely baked-on black enamel, and are equipped with a 21 candle power six-volt National Mazda nitrogen bulb. They are made entirely from steel stampings, including the bracket and clamps, and are light in weight, but of strong, durable construction. Each Howe Searchlight has a four-inch rear view mirror, making day time driving safer. A choice is given of seven windshield clamps.

Manufactured by the Howe Lamp and Manufacturing Co., 115-123 East Ontario St., Chicago, Ill. Prices, $4.50, $5.50, $6.50, $8.

Rosco Electric Bullet Midget Side Lamps. This bullet side lamp supplied with a frosted glass in the front and a red one in the rear not only helps to beau-



tify a car's appearance, but answers every purpose of ordinary side lamps coupled with a danger signal from the rear. It can be placed on any type body and on fenders front or rear, and is supplied complete with bolts and nuts. It is also popular for motorcycle side cars. The lamp is furnished in black and nickel, all nickel or all brass.

Manufactured by A. W. Rosen & Co., 610-614 Broadway, New York City. Prices, pair, less bulbs: Frosted glass, black and nickel finish or all brass, $4; frosted glass, all nickel, $4.50; cut star glass, black and nickel or all brass finish, $4.50; cut star glass, all nickel, $5. Lamp with Beehive glass; Black and nickel or all brass, $4.25; all nickel, $4.75.

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NATIONAL ROAD BUILDING PLAN

Total of $343,000,000 Federal and State Funds Available This Year, with Expected Expenditure of $280,000,000 More by States and Municipalities.

IMPORTANT steps have been taken to expedite road construction under the enlarged program recently authorized by Congress, and indications are that a larger volume of highway construction will be accomplished this season than in any previous year, according to Secretary of Agriculture David F. Houston. He says the requisite official machinery for executing the program—the Department of Agriculture through the Bureau of Public Roads on the one hand and the 48 state highway departments on the other—is already in existence.

A conference was recently held by Secretary Houston with the state highway commissioners of the eastern and middle western states. All phases of the problem, and especially the interpretation of the liberal amendments of the Federal Aid Road Act, were considered.

The regulations issued under the act have been carefully revised, and the standards for plans, specifications and estimates have been modified to meet special conditions existing in some states. Other changes in practises and procedure have been made—all with the definite object of expediting the work.

The appointment of Thomas H. McDonald, chief engineer of the Iowa State Highway Commission, as engineer in immediate charge of the work of the Bureau of Public Roads under the Federal Aid Act, has been announced.

At the conference with the state highway departments it developed that the present freight rates are one of the principal obstacles to the active resumption and extension of highway activities. The situation has been laid before the proper officials of the railroad administration and the question is now under active consideration.

Secretary Houston has taken up with the secretary of war the question of releasing from the army highway engineers in this country and abroad, in order that their services may be utilized during the coming road construction season. Secretary Houston in summing up the general situation, said:

"During the war it was necessary to curtail road construction operations, because of the difficulties of securing transportation, materials and the requisite services. Now that the situation has changed the work will be actively resumed and vigorously prosecuted notwithstanding the fact that conditions are still abnormal in some respects, especially with reference to the prices of materials and supplies. It is not believed that the nation can wait for prices to recede before beginning industrial operations. Such hesitation will add to the difficulties instead of lightening them.

Larger Funds for 1919 Work.

"The Congress at its last session accepting the recommendations of the Department of Agriculture, not only made available from the Federal treasury large additional sums for road construction in cooperation with the states, but also made some important amendments to the Federal Aid Road Act. These amendments will have the effect of greatly lessening the difficulties of selecting and constructing needed roads. The amount of Federal funds available for road building on March 1 was over $72,900,000, which under the law must be matched by at least an equal amount from the states, making a total of $145,800,000, including approximately $9,800,000 from Federal and state sources for roads in the national forests. On July 1 $95,000,000 more of Federal funds will become available for general road purposes and $4,000,000 for national forest roads, which, with equal contributions from the states, will provide an additional $198,000,000 for Federal aid road work, making an aggregate sum of $343,800,000 for the calendar year. In other words, the 1919 program for Federal aid road building is greater than any previous annual road building accomplishments in this country. It is so great, in fact, that the states will undoubtedly defer taking up part of the Federal funds until 1920, because experienced contracting and engineering organizations must be developed from the stagnant conditions of the war period before any exceptional amount of road building gets under way.

"The states and their civil subdivisions also will carry on a large amount of road work without Federal Aid. The extent of this is uncertain and will depend upon local labor, industrial and agricultural conditions. The present indications are that approximately $280,000,000 will be spent in this way.

"The Federal Aid Road Act as amended places only three limitationss on the type of road to be constructed, as follows:

"1. That the roads shall be 'substantial in character.' This means that the road must be constructed so that it will carry the prospective traffic with such maintenance expenses that the total annual charges will represent a reasonable expenditure for the public service rendered by the highway. It is to the interest of the states that the roads on which Federal funds are used be substantially constructed because the law requires the states or other civil subdivisions, as a requisite to receiving further funds, to mantain properly all roads built with Federal aid. There is nothing in the law which restricts types of construction between narrower limits than those established by sound finance and good engineering practise.

"2. That the amount contributed from the Federal treasury in connection with any road shall not exceed $20,000 a mile. The main thing is to build a road that will stand the traffic in the particular section of the country where it is constructed. The conditions in certain sections may require a heavy, expensive type of road, while in other sections a less expensive type may meet all the requirements. It was noticeable in the recent conference with highway officials that sentiment is growing throughout the country, even in the newer sections, in favor of more substantial roads. The people are beginning to realize that the expense of maintaining the lighter types where the traffic is heavy is unbearable. It might be well in this connection to point out that one of the first steps taken after the passage of the Federal Aid Road Act was to suggest to the state highway departments that in order to prevent haphazard action they arrange to outline a tentative system of roads which might be developed as the circumstances made it possible, subject, of course, to such changes as conditions demanded. The highway departments have been working on this matter and, in general, the projects have been developed accordingly. In planning and revising their systems, due consideration it is assumed, has been given by the highway authorities to connecting interstate roads.

New Definition of Post Roads Aids Work.

"3. That the road must be a 'rural post road' as defined in the act as amended, that is, 'any public road a major portion of which is now used, or can be used, or forms a connecting link not to exceed 10 miles in length of any road or roads now or hereafter used for the transportation of the United States mails.' Under the original wording of the law Federal funds could be expended only upon roads upon which the United States mails 'now are or may hereafter be transported.' This required a definite determination in each case of the actual post route status of the road, which necessarily involved delays in many instances. The definition of the term 'post roads' has now been changed in such a way that very few important roads will be debarred from receiving Federal aid, if all the requirements of the act are complied with. This feature of the original law was the most troublesome to the highway departments of the various states. Its modification will go far toward facilitating the prosecution of the work. It has already done much to convince the state authorities of the purpose of Congress and the intention of the Department of Agriculture to assist in the resumption and extension of road building in every practicable way.

"It will thus be seen that a broad and comprehensive road building program has been inaugurated. This program is being vigorously pushed and the indications are that a larger volume of highway construction will be accomplished this season than in any previous year in the history of the nation. Furthermore,

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the work is being done in such a way as to utilize to the best advantage the road building experience and facilities of the whole country.

State Department Supervision Best.

"The purpose of the Federal Aid Road Law is to encourage the construction of roads of a substantial nature by the states and to provide adequate safeguards for securing systematic and economical action. Long experience has shown that the best results will be secured if the work is performed under the supervision of the state highway departments, the method of the control depending upon local conditions. The greater the administrative and technical ability of these departments the greater will be their usefulness to the taxpayers of the state. Under the Federal law the state highway departments have been strengthened and developed in a way that could not be equalled under any other type of national road legislation that has been suggested. The progress that has been made in this direction is very gratifying and helpful and the existence of an effective central highway agency in nearly every state of the Union, actively cooperating with and supported by the Department of Agriculture, makes it possible to speed up road building more rapidly than any other branch of public works. By devoting all its energy to helping each state inaugurate the work as quickly and as extensively as possible, the Department of Agriculture multiplies its resources 48 times, and is a cooperator instead of a competitor in placing men and materials on the highways where they are most needed. It is the plan of the department to maintain the closest possible touch with the state highway departments and it is contemplated that the American Association of State Highway Officials will, in the near future, be requested to designate some of its members to serve on an advisory committee to cooperate with the department in the administration and execution of the provisions of the Federal Aid Road Act."

PLANS FOR NEW GARAGES IN PHILADELPHIA.

Plans have been made for a garage and stores at 55th street and Woodland avenue, Philadelphia. It will be one-story, brick, 85 by 120 feet. Fred N. Greisler is the architect.

Charles G. Kirkpatrick will erect a one-story brick garage 60 by 90 feet at Queen lane and Schuyler street, Philadelphia.

HARRIS OPENS HUB SALESROOMS FOR OLDFIELD.

R. W. Harris, formerly connected with several tire firms and for many years sales manager for the Gray & Davis Co., has embarked on a new enterprise, the R. W. Harris Tire and Rubber Co., which is handling Oldfield tires, with sales rooms at 737 Boylston street, Boston.

An export office will be opened in New York by the Apperson Bros. Automobile Co., Kokomo, Ind., with George H. Strout in charge.

CASSIDY CO. TO SELL GREDAG.

The Acheson Graphite Co., Niagara Falls, has arranged for the Edward A. Cassidy Co. to act as the sales department for Gredag.

Gredag is a lubricant perfected by Dr. E. G. Acheson, a noted scientist on lubrication. It is a blending of highest quality grease with 99.9 per cent. pure Acheson-Graphite (not mined), that is manufactured by the special Acheson formulas and process.

The high quality of Gredag is evidenced by the fact that over 30 leading makers of automobiles, trucks, motorcycles and tractors have made Gredag the standard lubricant, and that it is the recognized quality lubricant in the industrial field.

Plans are now under way and will shortly be executed for a progressive and far-reaching sales and advertising campaign, national in scope, and the splendid reputation made by Gredag in the industrial world, coupled with the Cassidy merchandising policy, offers a remarkable opportunity to the automobile trade.

DIXON'S VALUABLE BOOKLET.

The Joseph Dixon Crucible Co., Jersey City, N. J., has issued a pocket catalogue entitled, "Dixon's Graphite Products," which furnishes a good idea of products made by this concern. Pages are devoted to lists of articles especially for mills, railroads, automobiles, etc. Descriptions are brief. The catalogue should be in the file of purchasing agents, engineers, superintendents and others who have occasion to use lubricants, paints or pencils. The company will send the booklet upon application and will also send pamphlets dealing in detail with any individual member of the lines.

MILEAGE GUARANTEE OF "JUMBO" TIRE INCREASED.

The mileage guarantee on the General "Jumbo" tire has been increased from 5000 to 7500 miles. This was done because of the unusual records which the tire has been making. The "Jumbo" is a special oversize for Fords, Maxwells, Chevrolets and other light cars using 30x3½ inch rims. Its tread is as heavy and its air space as large as a four-inch tire. Combed Sea Island cotton is used exclusively. The tire is made by the General Tire and Rubber Co., Akron, O., and sells for $31.90.

N. Y. COIL CO. BECOMES OWN DISTRIBUTOR.

The New York Coil Co., 338 Pearl street, New York, has discontinued distributing its products through the Gray-Heath Co., Chicago. All orders hereafter will be received at the New York office and goods will be shipped from the same place.

A farm tractor and implement demonstration will take place at the state fair to be held at Phoenix, Ariz., the week of Nov. 11-16.

ACCESSORY AND TRACTOR DEALERS DO BIG BUSINESS.

Dealers in automobiles and accessory and tractors are prospering, according to Bradstreet's, whose bulletin says:

"For the country as a whole trade is about fair; industrial operations are likewise. Best reports come from manufacturers and dealers in agricultural implements, tractors and seeds, but millinery and, to a lesser extent, shoes and lumber and other building materials have also shown more life.

"Automobiles and accessory dealers maintain their cheerful reports, practically all markets contributing, and the jewelry trade is claimed to be back to a good normal, with sales of high priced goods and precious stones especially good at large centers."

THINKS ENGLISH TRADE POLICY IS TEMPORARY.

The American Manufacturers' Export Association has announced that a study of British import restrictions, effective March 1, had led it to the conclusion that any temporary loss of British trade would enable American manufacturers to concentrate on other markets, and the imposition of these restrictions was not to be taken as an indication of permanent British policy.

HYATT ENGINEERING CHANGES.

Claude Greenhoe has become chief engineer of the motor bearings division of the Hyatt Roller Bearing Co., Detroit, succeeding R. G. Wells, now chief engineer of the Hyatt factories in Newark, N. J.

ARCH TIRE AND RUBBER CO.

The Arch Tire and Rubber Co., Inc., has been chartered with $5000 capitalization by W. Loewenthal, S. Bernheim and J. Jacobs, 1877 Broadway, New York City.

BOSTON DEALER HOLDS SHOW OF USED CARS.

Not all the attention of automobile week in Boston was lavished on the new cars on exhibition in the Mechanics' building, for, nearby, in Horticultural Hall, there was a show of entirely different nature, which emphasized the fact that the used car business had been lifted to a different plane than heretofore.

The George B. Cousins Co. occupied the hall and displayed reconstructed and exchanged cars of the better class. Pierce-Arrows, Marmons, Franklins, Oldsmobiles, Cadillacs, Packards and others were shown, each with a brand new body.

The hall was artistically decorated for the week, the color scheme including gold, green and rose. Each car stood on a green carpet with large gold panels, topped by lattice work entwined with crimson rambler roses to form a background. A band played. An admission charge of 25 cents was made and the proceeds were turned over to war charities.

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BETHLEHEM 18--36 FARM TRACTOR

A Rear-Driven Four-Wheel Automobile Design with Novel Adaptation of Buffer Springs to Absorb Stresses from Starting, Stopping and Braking.

COMMERCIAL production of a farm tractor has been begun by the Bethlehem Motors Corporation, Allentown, Pa., that has been given the trade name Bethlehem. The purpose of the company is understood to be concentration on a single design, and to produce this in as large numbers as the demand may justify.

The Bethlehem tractor is a four-wheeled, rear-wheel driven type that may be said to conform to what is known as automobile construction, the power being transmitted from the engine through a clutch and clutch shaft to a transmission gearset that is incorporated with a differential gearset and a live axle in a single housing.

The weight of the tractor is 6200 pounds and it is 144 inches overall length, 73 inches width and 67 inches height. The wheelbase is 89 inches. The turning radius is 25 feet. The tractor has a normal rated draw bar pull of 18 horsepower and 36 horsepower at the belt pulley. The normal draw bar pull is 3100 pounds. The number of plows recommended is four 14-inch bottoms. The percentage of weight on the drive wheels is 65. The fuel recommended for work is kerosene, but the engine is started with gasoline.

The diameter of the rear wheels is 54 inches and face width 12 inches. The front wheels are 32 inches diameter and the faces six inches width. The belt pulley is 10 inches diameter and the width is 7½ inches. Its speed is 1278 revolutions a minute.

Engine an I-Head Type.

The power plant of the tractor is a four-cylinder, four-cycle, water cooled, I-head, vertical engine, having cylinder bore of 4¾ inches and stroke of six inches, which is rated by the S. A. E. formula at 36.10 horsepower, but has 900 feet of piston travel at maximum speed. The cylinders are cast en bloc and the construction is conventional, the valves being the usual poppet type, two inches diameter. The crankshaft is a three-journal type with a total main bearing length of 11½ inches. The camshaft is also a three-journal construction 1¼ inches diameter.

The engine is cooled by a circulation of water through the cylinder jackets and a Fedders cellular radiator, the system having nine gallons capacity. The radiator has cast top and bottom tanks and heavy side columns. It is assembled with series of bolts and gaskets so that the cooling section can be removed quickly should there be occasion for repair. The water is forced by a centrifugal pump and radiation is promoted by a large belt driven fan. The engine is lubricated by a combination force feed and splash system that is maintained to be positive. The fuel is supplied through a Stromberg carburetor and a Wilcox-Bennett air cleaner and the source of the ignition current is a Bosch high-tension magneto of waterproof construction equipped with an impulse starter. The fuel is carried in a two-compartment tank having capacity for 14 gallons of kerosene and four gallons of gasoline that is mounted back of the rear support for the hood.

Power Plant and System a Unit.

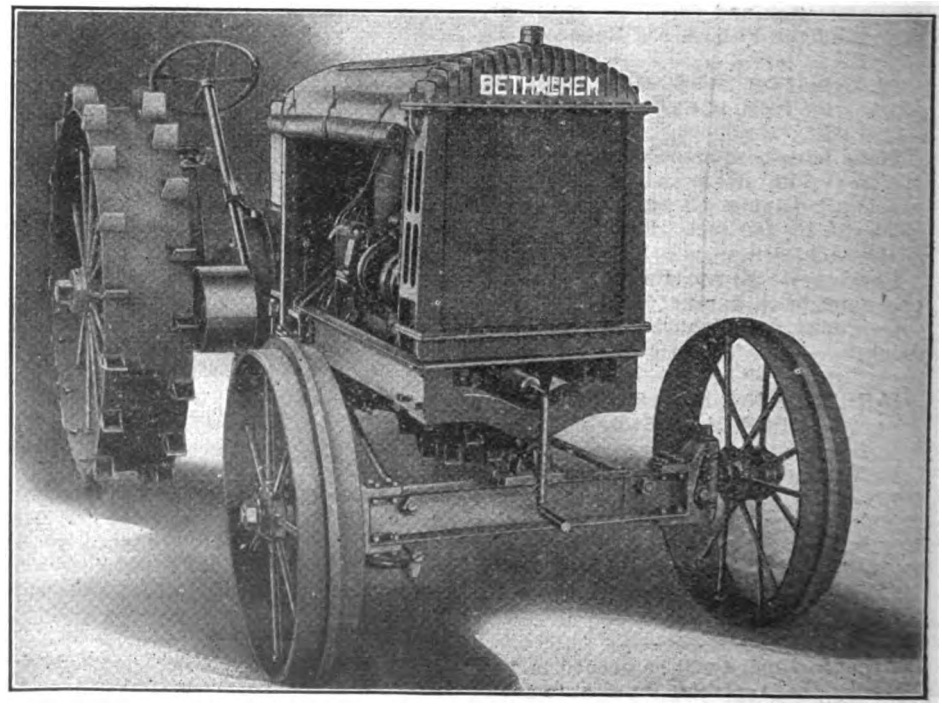
The designer followed a theory that has been adopted by a number of tractor builders, combining the engine and the power transmission system with the rear axle, and having a short frame, on which the engine is installed, supported by a cross member pivoted at the center of the front axle. This has the effect of three-point mounting, the forward end of the frame being free so that no matter what the nature of the surface of the ground there are no stresses upon it. The chassis frame is practically rigid and the driving system cannot be cramped by distortion, no matter what the load or the ground surface.

The clutch is a multiple disc type, a Hilliard construction, consisting of four large plates faced with anti-friction material, and from this the power is transmitted to the transmission gearset. This gearset is assembled with the differential gearset of the live axle in a single unit. The drive is spur gears. The shafts of the transmission gearset are special alloy steel, heat treated, and the gears are cut from high grade metal. All the bearings are Hyatt roller. The transmission gearset affords two forward speed ratios and reverse, the forward speeds being 1.8 and 3.3 miles an hour, and the gear ratios 82.2 to 1 and 42.6 to 1 respectively.

Gear Ratios May Be Reduced.

These are the normal ratios, but these can be changed by reversing the positions of two spur gears on the ends of the two shafts of the gearset that project through the left side of the main case and are enclosed by a cover plate retained by six bolts. When delivered the larger of the two gears is on the forward shaft, but by removing them and putting the smaller on the forward shaft the speeds can be reduced. The change, which can be made in a comparatively short time, may be necessary when the work to be done necessitates slower movement of the machine.

The rear axle is a live type and it has a novel spring suspension, which is intended primarily to absorb the stresses of starting. Fixed to the driving shafts of the axle are spiders, each of which has two arms, 180 degrees apart at centers, projecting from it. The ends of the shafts project into the hubs of the wheels, but are not rigidly keyed in them, although the wheels are retained on the shafts by lock nuts. The drive wheels are a built-up type with cast hubs and rod spokes. Each wheel has two flat steel tie members placed parallel equidistant from the hub and rim, the ends being riveted to the rim. At the centers of these members are mounted the ends of the arms of the driving spider, these being on heavy guides and centered be-



Three-Quarters View of Bethlehem Tractor to Show the Front Axle, Main Frame, Radiator and Part of Power Plant, the Radius Rods and Location of the Belt Pulley.

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tween two helical springs. As the arms may slide slightly on the guides there is absorption of starting stress, which will be taken by two springs of each spider until they are fully compressed. This is merely a new adaptation of the familiar type of buffer spring, used very generally for draw bars and draw heads, or for radiator supports. The springs to some extent cushion the shocks to the frame through the wheels.

Control Members on Axle Housing.

All the control members are assembled with the rear axle and transmission gearset housing. On the top of the axle housing is a cast bracket in which is mounted the shaft of the gear shift, this shaft extending backward to a ball ended lever near the driver's seat. At the right side of the housing is a bracket that supports the steering arm, the gear being a worm shaft and worm wheel type linked to the front axle by pull rods. Two brackets, one at either side of the rear axle housing and cast integral with the case, carry the short frame for the driver's platform. Suspended from these brackets by two rods is a cross member that supports the swivelled draw bar. This cross member is drilled with holes so that the draw bar may be adjusted to various positions to obtain differing draft effects. The draw bar is positioned to locate the implement hitch 17 inches above the surface.

The main frame consists of two short side members bolted to the rear end of the engine case and a front cross member that is shaped to give clearance for the forward end of the crankshaft and the crank handle. The front axle is a straight I section with bolted-on yoke ends, with heavy steering knuckles with unusually large pivots. On the center of the axle is a bracket on which is pivoted the front frame member, so that the axle may rock freely without stress upon the frame. The relation of the axle is maintained by a V shape radius rod, the ends of which are secured to the axle and the apex is mounted on the housing of the transmission gearset.

The brake is a contracting band type, each shoe operating on a rear wheel hub. These are controlled by a hand lever. The belt pulley is at the right side and is driven by gears from the main shaft, this being driven constantly. It is controlled by the main clutch. The engine is protected by a permanent hood that has a removable section over the head of the cylinder block, and this may be removed whenever work on the spark plugs, the ignition wiring or the valves is necessary. The sides are protected by curtains that may be rolled to expose the engine to full cooling influence of the air.

The air intake of the carburetor is supplied through a large cast jacket surrounding the exhaust manifold, at the rear end of the engine block, and the exhaust and intake manifold are formed integral, so that the fuel is pre-heated before it is taken into the engine cylinders.

R. A. Doty has become associated with the wholesale organization of the Overland Hanson Co., Waterloo, Ia. He was formerly mayor of the city of Waterloo, Ia., and more recently with the Cushman Motor Works, Lincoln, Neb.

Heavy Tourist Traffic Predicted for This Season.

The American Automobile Association announces that an unprecedented amount of transcontinental motor traffic is expected during the coming season. The touring bureaus of the association in Washington and New York both report that no day passes without inquiries being received relative to road conditions and general information about the various transcontinental routes.

The bureaus for months have been in correspondence with highway officials, club secretaries and local road boosters throughout the entire western section of the country, and have collected a vast amount of information about present road conditions, hotel and garage accommodations, and scenic and historic features. A. L. Westgard, the well-known transcontinentalist, who is now the A. A. A. field representative, will give special attention to transcontinental travelers.

Showing all the principal routes and connections, the A. A. A. master map is now being given the final corrections and will be ready for distribution by the beginning of the touring season. In addition to including all available routes, this map will also carry a brief description of those most used by motorists, as well as much valuable data regarding camping outfits and other items essential for trips of this kind.

Supplementary detailed state maps are also being prepared, notably one of Arizona and New Mexico, which shows in great detail all features of that intensely interesting region, such as the various Indian pueblos, prehistoric cliff dwellings, petrified forests, canyons, missions, etc. This is the first road map of that region ever compiled direct from data taken on the ground.

Digests of the principal transcontinental routes have been compiled and these have been laid out in the form of day's runs, giving the mileage for each day, best hotels and other essential facts.

Eastern motorists in search of new thrills are urged to give consideration to American tours this year, particularly as the battlefields of Europe will not be thrown open to tourists for some time to come. Most people are not aware of the tremendous amount of new construction work now going on in states which hitherto have done little or nothing in this respect.

SCRIPPS-BOOTH HAS NEW HUB SALES ROOM.

The Scripps-Booth Motor Car Co. of Boston has opened a new sales room and service station at 5-7 Brighton avenue. The Scripps-Booth Corporation of Detroit is now a subsidiary company of the General Motors Corporation, and the demand for its new six-cylinder cars made necessary the doubling of the Boston sales room and service station.

PEERLESS REPORTS $3.87 EARNINGS PER SHARE.

The annual report of the Peerless Motor Truck and Motor Corporation and subsidiaries for the calendar year 1918 shows a balance earned on the $10,000,000 of capital stock outstanding, per $50, equal to $3.87 a share, compared with $4.74 a share earned in 1917. The net sales showed a decrease of $7,039,373 from the 1917 figures, in which year the company had large contracts for trucks from the British government. The total income last year of $1,074,990 compared with $1,707,641 the preceding year, and the net profits after all charges and war taxes amounted to $773,895, against $949,503 in 1917 and $1,358,810 in 1916.

The company's balance sheet as of Dec. 31 last, shows total assets of $14,592,147, against $18,323,909 at the close of 1917. This falling off is due mostly to the writing down of the value of patents, plants, land and inventories. Cash holdings amount to $1,790,890, against $2,869,569, but Liberty bonds valued at $1,600,731 appear in the statement for the first time. Accounts and notes payable disclose a decline from $2,098,205 to $1,627,683, but accounts payable are $347,292 less, at $917,122. The profit and loss surplus stands at $4,588,972, against $4,371,918 at the end of 1917.

AUTOMOBILE MEN ENJOY DINNER IN WAR TANK.

When the automobile show was in progress in Boston a quartette of well known men enjoyed luncheon in perhaps the most novel place in Boston for such an event. The table—it was a mighty small piece of furniture—was laid in a genuine war time tank, which occupied a place of honor in front of Hotel Brunswick.

Those who had luncheon in the tank included Albert Champion of spark plug fame, Chester I. Campbell of the automobile show, L. C. Prior of the Hotels Lenox and Brunswick, where many show visitors were quartered, and John H. MacAlman, president of the Boston Automobile Dealers' Association.

NEW ENGLAND FORD MEN HAVE CONFERENCE.

Ford Motor Co. dealers throughout New England states visited Boston on Thursday of show week as guests of the Boston branch of the company. At a business conference addresses were made by J. J. Harrington, C. A. Brownell, Sales Manager E. P. Hobart and W. J. Ryan.

The meeting established a precedent in the history of the branch, inasmuch as it was the first gathering of all the New England dealers of the Ford organization and, judging from its success, there seems to be no doubt but what it will be repeated from time to time.

Jack Neely has assumed the duties of assistant sales manager of the Barley Motor Car Co., Kalamazoo, Mich. He was formerly with the sales department of the Roamer distributing agency at Kansas City, Mo.

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ACCESSORY MAKERS MAY SEEK EXPORT TRADE.

Numerous ways in which motor car and accessory manufacturers may combine to form export organizations to promote world wide sales in competition with manufacturers in other countries were explained by Allen Walker of the Guaranty Trust Co., New York City, and Gilbert H. Montague, author of the Webb-Pomerene act, at the Export Managers' Convention of members of the National Automobile Chamber of Commerce in New York.

As a result of the information given the export committee of the association will make further investigation into the subject and report its recommendations to the membership.

James R. Stuart, an expert on trade mark laws, cited instances in which the failure of American manufacturers to register their trade mark in Argentine, South America, Germany and other countries had shut their goods out of these countries until expensive settlements were made with persons or firms resident there who had registered the marks under the laws of their own countries.

D. B. Richardson, foreign sales manager of the Studebaker Corporation, told of advantages to be derived by standardization of straight side tires as equipment on cars for export and showed how it is being accomplished by cooperation with American tire companies.

Ira A. Campbell, admiralty counsel of the United States Shipping Board, told how the merchant marine provides the medium for building up markets abroad and outlined a plan under which the ships built and acquired by the Emergency Fleet Corporation and the Shipping Board may be operated under government ownership until such time as private interests desire to buy them.

NEW DEPARTURE CONTRACTS FOR ADDITIONS.

The New Departure Co., Bristol, Conn., has awarded contracts for the erection of a one-story brick and steel factory building, 103 by 283 feet, to be used for a metal tempering shop; for a factory addition, two stories, 30 by 103 feet, for a laboratory and offices, and two concrete oil tanks, with a capacity of 250,000 gallons each. The total approximate cost is $250,000.

BROOKLYN GARAGE INCORPORATED.

A charter has been granted in New York state for the Sackett Street Garage, Inc., Brooklyn, with $5000 capitalization. The incorporators are S. Rakowitz, D. Getz and M. Cohen, 127 East 106th street.

TIRE COMPANY GETS CHARTER.

The Paramount Tire and Rubber Co. has been chartered in Delaware with $100,000 capitalization by E. D. Benedict, P. Zak and M. Biedenkopf, all of Chicago.

BAR MOTORS IS ENGLAND'S PLAN FOR IMPORTS.

Conspicuous among the American products which find themselvs against what virtually amounts to a stone wall under the proposed plan of British imports is motors. Free trade newspapers in England have sharply criticised the government's policy regarding importations, as disclosed by Sir Auckland E. Geddes, minister for national service and reconstruction.

He said that all importation of manufactured and semi-manufactured commodities which are permitted to enter Great Britain would be controlled by a system of special licenses until Sept. 1, when the question would be reviewed.

England is swarming with American business men who came over fully expecting to reestablish their old connections as soon as the vital factor of tonnage permitted. They realized that while the war was being waged the allied governments had the first call on shipping, regardless of private interests. They have the tonnage now, but find that official barriers have been erected against their using it.

Some think they have a grievance. They kept up their British establishments at a loss during the war on the expectation of doing business again immediately after the close of the struggle.

The process of obtaining import licenses is that each prospective importer must present his case to the Board of Trade and to the controller of imports. Each case is dealt with on its merits, as the controller judges it from the importer's standpoint, and the Board of Trade's first consideration is whether the goods in question can be obtained from English firms.

If they can, the license is refused. If the importer makes out a particularly strong case for special consideration, he will be permitted to ship limited quantities.

ILLINOIS GARAGE OWNERS PLAN CONVENTION.

Twenty-six of 51 congressional districts were represented at a meeting of the directors of the Garage Owners and Automobile Dealers' Association of Illinois, held in Peoria. An intensive membership campaign was arranged. There will be a convention in Peoria in October. Local associations will be affiliated with the state body.

SPARK PLUG TESTER CORP.

The Perkins Spark Plug Tester Corporation, New York City, has been chartered with $5000 capitalization by E. D., R. E. and V. Brown and N. Rothenburg, 35 Nassau street, New York.

TIRE COMPANY CHARTERED.

The West Gate Tire and Rubber Co. has been incorporated with $5000 capitalization by W. Loewenthal, S. Bernheim and J. Jacobs, 1877 Broadway, New York City.

WILL LICENSE AUTO MECHANICS IN OREGON.

The Oregon Legislature has passed a bill providing for the licensing of automobile mechanics. Applicants for licenses will be examined by a "Board of Auto Mechanics Examiners." The fee will be $5 a year. The board may at any time revoke the license for incompetency or other cause. The bill provides that "members of said board shall be qualified auto mechanics and shall receive as compensation for their services the sum of $10 per day actually and necessarily employed in the performance of their duties, together with traveling and other expenses.

Money received in fees will go to the general fund. The board will meet at least bi-monthly to hold examinations in Portland, La Grande, Astoria, Klamath Falls and Eugene. This is the definition of an auto mechanic as given by the bill:

"An auto mechanic is hereby defined to be any person who shall work for hire or hold himself out to work for hire upon any automobile or auto truck. And no auto mechanic shall work for hire or hold himself out to work for hire upon any automobile or auto truck within the State of Oregon without first having complied with the terms of this act; provided that nothing herein shall be construed to apply to any person not regularly employed in any garage whose employment requires the use of an automobile or auto truck and whose duties in part consist of keeping such automobile or auto truck in repair."

The last section of the bill states: "On and after six months from the taking effect of this act any person who shall violate any of the provisions hereof shall be deemed guilty of a misdemeanor, and upon the conviction thereof shall be punished by a fine not to exceed $100.

DEPARTMENT STORES ARE NOW SELLING TIRES.

Commenting upon the action of department stores in stocking automobile tires, a dry goods publication says: "It means a great stride forward in the automobile business, this recognition that the motor tires are a commodity so universally classed in the public mind as not only a unity but an essential in the scheme of things, that the great circulation depot for merchandise, the department store, must be ready to meet the community demand with the supply."

AUTO AND GARAGE FIRM.

Lowy & Duschanes, auto and garage business, has been incorporated with 350,000 capitalization by A. J. Klein, J. Goldschmith and J. Giniger, 163 East 102nd street, New York City.

WILL MAKE TIRES.

The Mileage Service Station, Inc., to manufacture automobile tires, has been incorporated with $100,000 capital by W. F. O'Keefe, J. H. Dowdell and George G. Steigler, Wilmington, Del.

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"THOSE WERE THE GOOD OLD DAYS."

The first private garage constructed in New York City, says Chevrolet Review, was built in the spring of 1900 by a prominent New York automobile enthusiast, who at that time owned three motor vehicles.

In 1899 New York automobile laws allowed automobiles to travel at the rate of not more than four miles an hour around street corners.

Among the first great institutions of learning to officially recognize the motor car was Columbia University. In May, 1900, the faculty of that university announced a course in "Traction Engine and Carriages."

That even the early horseless carriage retained at least one characteristic of its honorable predecessor, the horse, is evidenced by the following item written in 1900: "The claim advanced by the early pioneers that an automobile could not run away like a horse is being disproved by actual experience. Accounts of automobile runaways are not infrequent in the daily press."

The Chinese looked with disfavor upon the early automobiles, fearing that their introduction in the land of tea would displace the porters, who were very numerous, from their jobs.

In England during the early days of motor vehicles there was a decided preference for the name "motor house" rather than "garage."

CASTOR OIL FOR ENGINE LUBRICATION.

Castor oil can be used in the engine, but it would necessitate taking the engine apart frequently, according to Clifford Brokaw, mechanical director of the West Side Y. M. C. A. Automobile School, New York. He says:

"Frequently I am asked why castor oil cannot be used in the auto engine. It can, if one cares to take the engine apart once in two or three weeks, perhaps oftener. The fact is that while it is a superior lubricant, it gums quickly when allowed to stand for a brief time. The racing engine is run a few hours and then disassembled and cleaned. So with the airplane engine; it is disassembled after each flight for inspection and fresh castor oil is put in."

HUB COMPANY CHARTERED.

The Graham-McLain Co., Boston, has been chartered with $25,000 capitalization to deal in motor vehicles. The parties are James E. White, Natick; Ernest G. Graham, Roslindale, and Hubert E. McLain, Natick.

NEW MICHIGAN DISTRIBUTOR FOR STUTZ CARS.

As distributor for the Stutz motor cars in Michigan, the Stutz-Kettenring Sales Co. has been formed in Detroit. The Smith Motor Co. formerly had the Stutz agency. W. C. Kettenring is manager of the new company, which has headquarters at 1168 Cass avenue.

Women's Motor Corps Was Organized in Boston

The American Red Cross Motor Service, which now has 279 corps, with a membership of 12,000 women, who donate the use of their cars—a motor car equipment of fully $17,000,000 value—and their own services, had its birth in Boston.

Mrs. Kilroy Kenyon, a major in the English Green Cross, came to this country a little more than two years ago to tell the American people of the work of the women volunteers of that organization, who were using their motor cars to transport wounded British soldiers from the London railway terminals to the hospitals.

Major Kenyon was the guest of Mrs. Odlin Roberts, 32 Lime street, Boston. After the major had departed, Mrs. Roberts conceived the idea of having Boston women use their motor cars for carrying needy sick people, particularly children, to the hospital for treatment. As a result there developed the Women's Volunteer Motor Corps of the Boston Metropolitan Chapter, American Red Cross.

Mrs. Roberts began to formulate plans for the Motor Corps. The project was talked over at an informal meeting in January, 1917, following a meeting of surgical dressings workers at the home of Mrs. Carteret Fenno. Eliot Wadsworth, vice chairman of the Central Committee of the American Red Cross, was the principal speaker at this meeting. His sister, Mrs. Guy Waring, now commander of the Women's Volunteer Motor Corps, was present.

Mrs. Roberts and Mrs. Waring in January and early February developed the plans for the organization. Mrs. Roberts outlined the plans in a letter to the National Red Cross organization. Hospital officials said they would welcome the cooperation of the women drivers.

The Harvard Infantile Paralysis Commission asked for the service of nine cars a week to carry children from their homes to the commission's after-care clinic for infantile paralysis at the Children's Hospital. The service to the commission has been so helpful that it is continued today.

The national organization sanctioned the proposed corps and on Feb. 19, 1917, nearly two months before the United States entered the war, the service was started. The women volunteers responded regularly to all calls made upon them, even in severe weather. The Motor Corps grew rapidly. From Feb. 1, 1918, to Feb. 1, 1919, the Motor Corps averaged nearly 3000 calls a month. It carried an average of approximately 571 patients, nurses and doctors, and it is now assisting 50 hospitals, institutions and committees, in addition to the various departments of the Boston Metropolitan Chapter.

The Ambulance Division has been in operation only three months. It has carried 1647 patients, answered 2552 calls and covered 5753 miles in 2488 hours of active duty.

There are now 96 women on active duty, including the members of the Ambulance Division, and at least 100 more on the reserve list. With branch corps more than 150 women, with 12 ambulances and more than 150 motor cars, with seating capacity from two to seven each, could be mobilized in event of great emergency, most of them probably within an hour.

From the day the United States entered the war the Motor Corps has aided the army and navy and national and state committees in every way possible. From the time our troops began to embark for France until the armistice, the corps' motor cars met the soldiers sent back from Halifax and carried them from one railroad station to the other, or to hospitals. This was a service it had to perform as secretly as possible.

Convalescent soldiers in base hospitals are frequently given pleasure rides.

Mrs. Roberts resigned as commanding officer of the Motor Corps in February after two years of active and inspiring leadership, and Mrs. Guy Waring has succeeded her. The corps was not organized to meet the emergencies arising from war, but to perform a peace duty, to transport the needy sick from their homes to hospitals for treatment they could not otherwise receive, and to carry physicians, nurses and social workers to the homes of the needy sick. The members have paid all the expenses of their cars.

WANTS DISCHARGED SOLDIERS TO GUARD PROPERTY.

City Manager Fred H. Locke, Grand Rapids, Mich., suggests that discharged soldiers be employed to guard government property. "I understand that there is between $15,000,000 and $20,000,000 worth of government property in Grand Rapids and western Michigan, which, as soon as it is duly inventoried and released from control of the private concerns which now have custody of it, will have to be guarded until the government can dispose of it, and that gives me an idea of employment of some soldiers without jobs," said Mr. Locke. "The picric acid plant is the biggest parcel, of course. I should say that it would require a dozen men to guard that place alone. The buildings are valuable and there is a lot of valuable material left on hand. Then there is the airplane property and government property at a number of other plants which had war contracts. Perhaps 30 men could be employed in this city alone on guard duty and what would be more appropriate than to place slightly disabled soldiers at such work.

"Such property in other cities in Michigan would require many more guards. Altogether, a considerable number of returning soldiers can be provided for in this way.

ELECTRICS FOR SCANDINAVIA.

Notwithstanding the fact that freight and other charges raised the cost of an electric car costing $3500 here to about $8000 when delivered to a customer in Denmark or Sweden, more than 100 electric cars were sent to those countries in three months last year.

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Personal News of the Industry in Brief.

R. H. Johnston, former president of the Automobile Dealers' Association of New



R. H. Johnston, Former President of the Automobile Dealers' Association of New York City.

York City, is happy at the fact that the association is now about to enjoy the biggest boom in its history. With its proposed club rooms it will doubtless become a highly successful organization. During the years he was its president he worked hard to build it up.

Carl L. DuPuy has resigned his position of field representative of the Selden Truck Sales Co., Rochester. He is succeeded by M. B. Keith, who will handle the Oklahoma and Texas districts.

C. W. Price has been elected general manager of the National Safety Council to succeed W. H. Cameron, who has resigned to become manager of Industrial Relations for the Eastman Kodak Co. Mr. Price has been field secretary for the council for some time.

Dale Eller, who was a lieutenant in the field artillery has been honorably discharged and has returned to his former position in the sales engineering department of the Oakes Co., Indianapolis, Ind.

H. S. Hanchett, formerly connected with the Ford Motor Co. and recently manager for Bingham & Norton, St. Paul, dealer in Stutz, Reo and Scripps-Booth cars, has become sales manager for the North States Motor Co., Minneapolis, distributor of Auburn cars for Minnesota, North and South Dakota, Montana and Western Wisconsin.

F. W. Bartling has resumed his position as manager of the Bart Motor Sales Co., Liberty dealer, at Dayton, O. He was recently discharged from the army.

J. L. Bovis, for the past three years connected with the Oldsmobile organization, has been appointed general sales manager for the Tri-State Motors Co., Youngstown, O. The company distributes Oldsmobile passenger and commercial vehicles.

R. E. Clingan has resigned from the Hess-Bright interests in Cleveland. He was for 11 years associated with that company. He will become associated as manager with the Bock Bearing Division of the Standard Parts Co.

Walter Alden has been appointed manager of the service department of the Willys-Overland Pacific Co., San Francisco, Cal.

J. H. Phillips has assumed the duties of advertising manager of the Chicago branch of the Oakland Motor Car Co. Mr. Phillips has had wide experience in merchandising motor cars.

Nick Wood, for the past 10 years connected with the B. F. Conwell automobile agency, has taken the agency for Studebaker cars in Logansport, Ind. He will be located temporarily at the Point Garage at 211 East Market street.

W. A. Riley, formerly connected with the Studebaker Corporation, Dallas, Tex., has assumed the duties of sales manager for the North Texas Oakland Co., Dallas, Tex.

John O. Munn has become advertising manager and assistant sales manager of the Republic Motor Truck Co., Alma, Mich. He was formerly advertising manager of the Willys-Overland Co.

Claude Greenhoe is now chief engineer of the motor bearings division of the Hyatt Roller Bearing Co., Detroit, succeeding R. G. Wells. Mr. Wells has been promoted to chief engineer of the Hyatt factories at Newark, N. J.

S. A. Host has become connected with the Lincoln Motor Co., Detroit, Mich., under Frank G. Eastman, advertising manager. He was formerly director of publicity of the Lincoln Highway Association.

E. A. Ruck has become associated with the Automotive Corporation of Fort



E. A. Ruck of the Automotive Corporation of Fort Wayne, Ind.

Wayne, Ind. He will assume the duties of chief engineer.

V. K. McBride is now with the Premier Motor Corporation, Indianapolis,



V. K. McBride of Premier Motor Corporation, Indianapolis, Ind.

Ind. He was formerly assistant sales manager of the Federal Motor Truck Co.

Eugene Bemb is now manager of the service department of the factory of the Hudson Motor Car Co. He has been with the concern since its organization.

S. Bloom, for the past several years a factor in advertising and merchandising, both in the United States and Australia, has been appointed director of advertising of the Essenkay Products Co. Mr. Bloom has been with the 41st Infantry at Camp Funston, Kan., for the past year. He will assume his new duties at the plant and general offices in Chicago, Ill.

Walter E. Anderson has become associated with the Curtis Tire and Rubber Co. of Muskegon. Mich., in the capacity of sales manager. Mr. Anderson will direct the sales policies for Curtis. He is well known throughout the trade because of his former connections with the Miller Rubber Co. and the Quaker City Rubber Co.

E. J. Jones has become associated with the Kissel Motor Car Co. of Hartford, Wis., in the capacity of southern representative, handling the company's distributors and dealers in the southern states. He was formerly connected with the Empire Automobile Co. of Indianapolis, Ind.

A. J. Wise has succeeded J. O. Hofbauer as sales manager of the Paige Detroit Co. of New York. Mr. Wise has been with the company for several years.

Lawrence H. Pomeroy has severed his engineering connection with the Vauxhall Motors of London, England, and is coming to the United States to promote a valve in the head car of his own design.

J. Murphy, who has been for the past three years and a half in France, has joined the sales force of the Briscoe Motor Sales Co. The company distributes Liberty cars in St. Louis.

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Walter P. Hanson is now assistant advertising manager of the Haynes Automobile Co., Kokomo, Ind. He was recently released from government service, where he attained the rank of ensign in the U. S. N. R. O. Before entering the navy he was on the staff of the Chicago Examiner and has had considerable experience in newspaper work, having been a war correspondent on the Mexican border in 1916.

E. B. Ross, vice president of the Clark Equipment Co., Buchanan, Mich., has been elected Mayor of Buchanan. The city is noted as the home of internal gear axles and disc steel wheels for motor trucks. Mr. Ross is a graduate of the Baldwin Locomotive Works, where he reduced his scientific knowledge to practise after completing in 1902 his course at the University of Maine.

H. A. Goddard has assumed the duties of general sales manager of the Militor Corporation, New York City. In the eastern section of the industry Mr. Goddard is well known on account of being eastern representative and export manager for the Perfection Spring Co. After the company became a unit of the Standard Parts Co. he was made Detroit manager of the new company.

M. L. Heminway is now acting general manager of the Motor and Accessory Manufacturers' Association. He was formerly assistant manager. Before coming to the M. & A. M. A. Mr. Heminway was connected with the Rubber Association of America. He is filling the position of L. M. Bradley, who has gone South on a leave of absence.

Don M. Dickinson will represent the Parker Motor Truck Co., Milwaukee, Wis., in the southeastern section of the United States. Mr. Dickinson has had wide experience in the truck field, including connections with the Packard-Rochester Co., the Denmo Co., Cleveland branch and the Champion Motors Co., Inc. He has also been identified with the sale of Federal and Kissel trucks in Rhode Island. Besides being the manufacturer of the Woodworth truck he has the distinction of having operated the first jitney line in this country.

H. B. Niblette has been appointed supervisor of the tire sales division of the Thermoid Rubber Co., Trenton, N. J. For a number of years he was associated with the B. F. Goodrich Co. and recently has been a factory representative of the Quaker City Rubber Co. He has had varied experience in the tire business.

Lawrence Enos, for a year and a half first lieutenant in the Quartermaster Corps, has joined the Firestone Steel Products Co. of Akron, O., as manufacturers' representative in the Detroit district. Previous to enlistment in government service Mr. Enos was with the Steel Products Co. of Cleveland. For the past eight years he has been connected with the automobile industry.

M. H. Blank is now chief engineer of the Lynite laboratories of the Aluminum Castings Co., Cleveland. He was recently released as captain in the army. Previous to entering military service he was assistant engineer of the Premier Motor Corporation.

John R. Lee has resigned from the Ford Motor Co. He was connected with the Ford company for over eight years. Mr. Lee is credited with working out the details of Ford's profit sharing wage adjustment plan. During the past year he represented the Ford interest on the Automobile Industries Committee. He has not made known his future plans.

W. T. Francis is again with the Bearings Service Co., Detroit, Mich. He will be traveling representative of the Boston branch. Mr. Francis has been released from army service, prior to which he served as the company's New Orleans branch manager.

Jesse A. Smith was elected head of the Milwaukee Automobile Dealers, Inc., at the association's recent annual meeting. He is distributor of the Hudson and Essex lines in Milwaukee. The other officers of the association are: Vice president, R. G. Chidester (Packard); treasurer, F. J. Edwards (Dodge and Kissel); secretary and manager, C. P. Hatter (Buick). The directorate includes A. J. March (Mitchell), W. F. Sanger (Franklin), George W. Browne (Willys-Overland and Willys-Knight) and Al Reeke (Nash).

Lieut. W. J. Ahlstrom, recently dismissed from air service, has been appointed sales manager of Russell L. Engs, Inc., New York City, distributor of Cole Aero Eight cars.

George R. Hughes is now with the Service Automobile Co., 165-67 North Fourth street, Columbus, O., in charge of the electrical department of that concern. Mr. Hughes has had varied experience, having held the position of electrical engineer in the Delco factory at Dayton; also a year in charge of a big electric power plant at Jackson, O., and a year as train lighting equipment expert with the Barney & Smith Car Co.

Lieut. E. A. Wales has re-entered the employ of the Raybestos Co., Bridgeport, Conn, and will resume his pre-war duties as manager of its Detroit office. He was formerly chief of production, motors division, Quartermaster Corps, Cleveland, O.

Barry B. Cann has assumed the duties as sales manager of the Philadelphia branch of Apperson Bros. He was formerly with the Packard Motor Car Co., Detroit.

J. E. Whitten has become distributor for the Moline-Knight cars in Central Illinois. He was formerly with Root & Van Dervoort, Moline, Ill. He has taken the agency for the Scripps-Booth car.

Durdley R. Safreed is superintendent of the United Electric Repair Co., Columbus, O. He was formerly master electrician in government service. C. W. Gabriel has been appointed manager of the newly established concern.

Louis C. Block succeeds E. Maltby as head of the Philadelphia Automobile Trade Association. The other officers are: Vice president, Lee J. Eastman; secretary, H. B. Harper; treasurer, J. E. Gomery.

Frank Dawson is now general manager of the Gary Motor Truck Co., Gary, Ind. He was formerly connected with the Master Motor Truck Co., Chicago, in a similar position.

Howard M. Benedict has been discharged from the army as a lieutenant in the air service. Mr. Benedict has resumed a position with the Oakes Co., Indianapolis, Ind., in the pressed steel stamping department.

A. E. Vinton, for the past 12 years connected with the National Motor Car and Vehicle Corporation, Indianapolis, as assistant sales manager and later as export manager, has been appointed general sales manager for the New Jersey Car Spring and Rubber Co., Jersey City, N. J.

F. X. Newman is now vice president and sales manager of the Automatic Safety Tire Valve Corporation, Long Island City. He was formerly with the Wright-Martin Aircraft Corporation, New Brunswick, N. J.

G. E. Wirsching, formerly with the General Motors Export Co., has been appointed assistant to E. F. Sayers, general manager of the export division of the Garford Motor Truck Co., Lima, O.

E. L. Moorman has become manager of the sales department of the Highway Trailer Co., Edgerton, Wis. For several years he was sales manager of the Beloit Gas and Electric Co., Beloit, Wis.

C. H. Breaker has been appointed sales manager of the Diamond Chain and Manufacturing Co., Indianapolis. For the past year he has been in the air service and for nine years previous was with the Larkin company.

Charles O. Blackford is now in charge of the truck sales division of the Grand Rapids Overland Co., Grand Rapids, Mich. The company handles Bethlehem and Federal trucks.

W. H. Mason has resigned as manager of the Milwaukee branch of the B. F. Goodrich Rubber Co. to become associated in an executive capacity with the J. R. Petley Co., distributor of Diamond tires and other rubber products. A. G. Underwood succeeds Mr. Mason.

A. L. Jacobs has been made territory sales manager for the Banting Co., Toledo, distributors of Paterson cars. Harry Hodge has joined the force of the company and has been made city sales manager for Toledo.

Samuel W. Ramsey, recently dismissed from the United States air service, has been made manager of the St. Louis branch of the Southwest Nash Motor Co. Mr. Ramsey was formerly in the Overland service at Kansas City.

Walter B. Elcock has been relieved from duty as adjutant of the 157th Depot Brigade at Camp Gordon and upon dismissal he held the rank of major of infantry. He has returned as manager to the Atlanta office of the Portland Cement Association, which was under his charge in March, 1917.

Samuel B. Dusinberre, western manager of the New Departure Manufacturing Co., with office in Detroit, died on March 26. He had been with that company for eight years. Mr. Dusinberre had been associated as general manager of the Westinghouse Storage Battery Co. and previous to that was purchasing agent for the Westinghouse Machine Co.'s plant at Pittsburgh.

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(Continued from Page 27.)

Some Examples of Truck Earnings.

From these blanks the bookkeeper makes out the charges for the book and the simplest form of bookkeeping is employed. The monthly report for each truck is self-explanatory. It is presented the first of every month.

Here is a sample of one truck owner's account for September:

EXPENSES.

Storage, four weeks	$86.00
Driver's wages, one day	4.50
Driver's wages, five hours	2.50
New bracket and bolts	4.50
Repairing spring	5.00
Storage	15.00
Gas and oil	18.54
Commission	27.98
Business	$279.88
Expenses	164.02
Balance	$115.86

Here is the approximate cost of operation per day of a two-ton and of a 3½-ton Atterbury, based on 50 miles a day, 300 days to the year:

Driver—	Per Day 2-Ton	3½-ton
Fuel—Based on 23c a gallon	$3.00	$3.00
2-ton, one gallon to seven miles; 3½-ton, one gallon to six miles	1.64	1.92
Oil—Based on 28c a gallon. 2-ton, one gallon to 125 miles; 3½-ton, one gallon to 100 miles	.115	.14
Repairs and Overhauling. 2-ton averages $.035 a mile; 3½-ton averages $.04 a mile	1.75	2.00
Tires—Based on manufacturer's guarantee of 7000 miles. 2-ton estimated cost per set, $209.85; 3½-ton estimated cost per set, $284.94	1.49	2.04
Insurance, liability, property, collision and fire and theft. Depends upon local conditions, rates of insuring, etc.		
Cost per truck	.74	.82
Based on $15 a month, 300 days per year	.60	.60
Amortization at 10% a year. Investment to include standard body design, but less average cost of tires. 2-ton, $2586.72; 3½-ton, $3366.06	.86	1.12
Interest—6% per annum on investment, which amortizes at rate of 10% per annum	.28	.37
Total	$10.47	$12.01

Annual Earnings with 3½-Ton Truck.

Here is a year's account for a truck owner working with the Speedwell company:

LEO MAYNES. 3½-TON ATTERBURY.

January, 1918.

Expenses—	
Storage, gasoline and oil	$47.63
License and notary	25.50
Commission	57.83
Total	$130.96
Business	$578.39
Expenses	130.96
Due Maynes	$447.43

February.

Expenses—	
Storage, gasoline and oil	$57.85
Cash and wages	63.00
Commission	54.93
Total	$175.78
Business	$549.39
Expenses	175.78
Due Maynes	$372.61

March.

Expenses—	
Cash	$80.00
Storage, gasoline and oil	40.50
Commission	49.07
Total	$619.57
Business	$490.75
Expenses	$169.57
Due Maynes	$321.18

April.

Expenses—	
Cash	$90.00
Insurance	95.63
Storage, gasoline and oil	44.50
Commission	52.00
Total	$282.13
Business	$520.00
Expenses	282.13
Due Maynes	$237.87

May.

Expenses—	
Cash	$100.00
Insurance	47.12
Gasoline, oil and storage	38.95
Commission	52.50
Total	$238.57
Business	$525.00
Expenses	238.57
Due Maynes	$286.43

June.

Expenses—	
Cash	$80.00
Insurance	47.12
Storage, gasoline and oil	45.36
Commission	45.07
Total	$217.55
Business	$458.25
Expenses	217.55
Due Maynes	$240.70

July.

Expenses—	
Cash	$80.00
Repairs	7.75
Storage, gasoline and oil	43.08
Tires	367.03
Insurance	56.68
Commission	41.16
Total	$595.70
Expenses	$595.70
Business	411.64
Due Speedwell	$184.06

August.

Expenses—	
Cash	$108.00
Repairs	3.25
Storage, gasoline and oil	40.20
Commission	43.42
Total	$194.87
Business	$434.22
Expenses	194.87
Due Maynes	$239.35

September.

Expenses—	
Cash	$92.00
Repairs	9.50
Storage, gasoline and oil	33.54
Commission	27.98
Total	$164.02
Business	$279.88
Expenses	164.02
Due Maynes	$115.86

October.

Expenses—	
Cash	$93.90
Repairs	17.85
Storage, gasoline and oil	48.44
Commission	52.42
Total	$212.61
Business	$528.28
Expenses	212.61
Due Maynes	$315.67

November.

Expenses—	
Cash	$113.55
Repairs to rod	19.50
Storage, gasoline and oil	43.26
Commission	45.20
Total	$221.51
Business	$451.99
Expenses	221.51
Due Maynes	$230.48

December.

Expenses—	
Cash	$110.02
Repairs to parts	43.82
License	25.00
Storage, gasoline and oil	34.85
Commission	28.72
Total	$242.41
Business	$287.25
Expenses	242.41
Due Maynes	$44.84



Much of the Work Done Is Hauling Freight from the Railroad Terminals to Warehouses, Where Large Capacity Trucks and Big Crews Mean Quick Handling.

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This summary shows the following totals for the year:

Business	Expenses	Due Maynes
$578.39	$130.96	$474.43
549.39	175.78	373.61
490.75	169.57	321.18
520.00	282.13	227.87
525.00	288.57	286.43
458.25	217.55	240.70
411.64	595.70	*.....
434.22	194.87	239.35
279.88	164.02	115.86
528.28	212.61	315.67
451.99	221.51	230.48
287.25	242.41	44.84
$5515.04	$2845.68	$2853.42

One will note from the monthly summaries that advances of cash of $1010.57 were made to Maynes, so that deducting this from the total expense the cost of the truck as represented by the figures shown was $1842.85. Assuming 300 working days this was an expense of $6.14 a day. Out of this $6.14 a day was paid $367.03 for tire renewals, and the cost of repairs was $101.37.

SPEEDWELL MOTOR SERVICE CO.
DAILY TRUCK REPORT

Date

Truck No.

Driver

GAS	OIL	GREASE	Total Mileage
			Trip Mileage
			Per Mileage

START A. M.	STOP A. M.	START P. M.	STOP P. M.	WORK DONE FOR	
					1
					2
					3
					4

TRIPS

1
2
3
4

CONDITION OF TRUCK REPORT.

EXPENSE REPORT.

NOTICE—[illegible] other side of the card. THIS IS IMPORTANT.

The Daily Report Made by the Drivers to the Speedwell Motor Service Co., This Covering the Essential Operating Detail.

Revenue of a Two-Ton Truck.

A similar record for a year of the earnings, expense and net earnings of a two-ton Atterbury truck, owned by Charles Wade, from July 1, 1917, to June 30, 1918, showed the following totals:

Month	Business	Expense	Due Wade
July, 1917.....	$365.96	$126.54	$239.42
August, 1917..	326.75	127.35	199.40
September, 1917	275.39	125.77	149.62
October, 1917..	290.78	131.21	159.57
November, 1917	230.55	121.12	109.43
December, 1917	475.10	182.62	292.48
January, 1918..	429.45	206.52	222.93
February, 1918	416.15	158.28	257.87
March, 1918....	346.70	170.40	176.30
April, 1918.....	324.73	253.54	71.19
May, 1918.....	426.36	247.25	179.11
June 1918.....	370.00	210.60	159.40
Total.....$4277.92		$2061.20	$2216.72

This shows that the average earnings or "business" was $356.40 a month, the average expense a month was $171.78 and the average amount received each month by Wade was $184.56. Assuming 300 working days for the year this showed a daily earning of $14.26, an expense of $6.87 and a net receipt of $7.37.

The rates charged for service are $3 an hour for a five-ton truck, $2.50 an hour for a 3½-ton truck and $2 for a two-ton truck, based on a 10-hour day and 40 miles driving for a 3½-ton truck and a 10-hour day and 50 miles for the two-ton truck. The rates include the driver. The expectation is that the five-ton trucks will earn from $600 to $700 a month and the 3½-ton trucks from $500 to $600 a month.

*Expense exceeded revenue $184.06.

MCGRAW TIRE AND RUBBER CO. NOW IN CLEVELAND.

The executive and general offices of the McGraw Tire and Rubber Co. have been transferred from East Palestine, O., to Cleveland. The new offiecs are located at 1900 Euclid avenue. A sales and service department has been established at 1904 Euclid avenue to serve local passenger car and motor truck tire customers. The company from a modest beginning has grown into one of the largest manufacturers of tires in the United States. The company's factories at East Palestine are engaged exclusively in the production of high quality pneumatic fabric and cord tires and solid truck tires. Production plans indicate expansion from 5000 to 10,000 tires and tubes per day.

Sales of the well known McGraw casing, guaranteed for 5000 miles, so far this season makes certain of the company's sales increasing 100 per cent. for 1919. Truck tire sales are well over the 100 per cent. increase at the present time.

STEWART'S EARNINGS RUNNING AT LARGE RATE.

It is reported that the earnings of the Stewart Manufacturing Co. for the first two months of 1919 were at the annual rate of nearly $750,000 compared with net profits, before deducting special charges and providing for depreciation of $331,000 last year. As the bulk of the company's output is taken by automobile manufacturers and makers of motor accessories, it is only natural that the earnings of the concern should be favorably affected by restoration of normal conditions in the automobile industry.

NEW AUTO REPAIR FIRM.

The Herz-Westler Auto Repair Corporation, Manhattan, New York City, has been granted a charter in New York state with $10,000 capital. The incorporators are L. E. Herz, S. D. and B. E. Westler, 309 Haven avenue.

BROOKLYN FIRM INCORPORATES.

The Solid Tire Sales and Service Co., Brooklyn, N. Y., has been incorporated with $5000 capitalization by A. Meinken, W. Schulze and W. H. Maclean, 329 Hancock street, Brooklyn.

CHAMPION SPARK PLUG CO.'S BIG GROWTH.

From a small beginning, with a production of less than 300 spark plugs a day, the Champion Spark Plug Co., Toledo, has become the largest producer of spark plugs in the world. The company makes spark plugs for all types of gasoline motors.

To R. A. Stranahan and F. D. Stranahan, president and treasurer respectively of the company, is due largely the fact that the Champion organization was lifted from comparative obscurity into the front rank it occupies today.

They moved from Boston to Toledo so as to be nearer the big motor car factories, and although they started in to manufacture spark plugs on a small scale, it was not long before the quality of their product attracted the attention of a number of the more prominent automobile builders.

The first big contract closed called for the delivery of 100,000 plugs in 12 months. Others followed and in 1912 the business had grown to such an extent that it was found necessary to move into newer and larger quarters.

The original floor space was 300 square feet, which has been increased from year to year until the Champion factory of today has a capacity of 150,000 spark plugs per day.

AUTOMOBILE ACCESSORIES BRANCH.

Optimism was the keynote at the annual meeting of the Automobile Accessories Branch of the National Hardware Association in Detroit. The branch was organized three years ago. The membership is made up of jobbers, with manufacturers as associate members. Free exhibit space in the Hotel Statler, where the meeting took place, was provided for the manufacturers.

$500,000 TIRE FIRM.

The Prospect Tire and Rubber Co. has been incorporated in Delaware with $500,000 capitalization by Julius L. Rosenblatt, Alexander Jamison, Buffalo, N. Y., and Philip L. Garrett, Wilmington, Del.

H. L. CANNELL DEAD.

Herbert L. Cannell, for a number of years prominent in the automobile trade in Boston, died recently at his home in Everett, aged 50 years.

LU H. BRAINARD DEAD.

Lu H. Brainard, manager of the Ft. Wayne, Ind., store of the Kelly-Springfield Tire Co., died recently in Ft. Wayne.

TIRE COMPANY HAS BIG CAPITAL.

The Hercules Tire and Rubber Co., to manufacture tires, tubes, etc., has been chartered in Delaware with $1,500,000 capitalization by Margaret Paul, George D. Hile and Horace Neil, all of Cleveland, O.

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ANOTHER BIG AUTO BUILDING FOR BOSTON.

Another important realty transaction, involving the erection of a large building for automobile sales purposes, is reported in the newer motor trade district along Commonwealth avenue, Boston. The purchaser is William London, 18 Tremont street, who bought for investment. He will erect upon the land a building for the Henshaw Motor Co., Dodge Bros. dealer, and the Henshaw company has already signed the lease.

The deal involves the land at 989-997 Commonwealth avenue, between Gaffney and Babcock streets, and adjoining Braves' field, the tract having a frontage of 120 feet on Commonwealth avenue and a depth of 200 feet, having an area of approximately 24,000 square feet.

The building will be designed for the sale of passenger cars, trucks and used cars and for delivery purposes. The Henshaw company proposes to continue its service and storage station on Griggs street.

The new building will be two stories high and so arranged as to permit daylight on all four sides. Provision will be made for future expansion. This will be the seventh time the Henshaw company has been obliged to move because of the increase of its business in the five years since the first Dodge Brothers car reached Boston.

The new building will be in the same neighborhood as the buildings that are to be erected for the Noyes-Buick Co. and the Buick-Boston Co. At least two other automobile concerns are considering building in the locality.

EDGE PLANS CAR TO COMPETE ABROAD WITH FORD.

S. F. Edge, the English motorist, plans shortly to start manufacturing a small car which is to be a competitor abroad of the Ford company. Edge, who is an automotive engineer, has for years been connected with Napier. Mercedes and Benz, the two biggest German automobile manufacturing concerns, are reported to be planning to bring out respectively a four and a six-cylinder car, which, complete with body, electric starting and lighting system and other features, are to sell at $2000. This price would be less than one-half of what the lowest price Benz or Mercedes was at the start of the war.

STUDEBAKER AGENCY AT PROVIDENCE.

A new Studebaker agency has been opened in Providence, R. I., at 420-430 Broad street, under the name of Tyas & Wood. H. W. Tyas has been connected with the Studebaker Corporation in Providence for eight years, and George C. Wood, the other member of the partnership, was formerly with the Studebaker agent at Riverpoint, R. I.

Harry H. Hawke, who has been wholesale manager for the De Luxe Automobile Co., St. Louis, is now general manager of the Traffic Motor Truck Co., St. Louis.

Columbia Motors Plan to Build a New Factory.

The Columbia Motors Co., Detroit, announces that architects are now at work on designs for a new plant, which will be the very latest and most improved type of factory. No change is contemplated in the present series of cars. The present line of models has been practically unchanged for four seasons.

A. T. O'Connor, secretary and treasurer of the company, says the demand for Columbia Sixes has shown a healthy increase all during the four-year period of the war and has now reached a point where the company feels justified in providing a larger plant.

While the factory is still engaged in turning out its contract for trucks, most of the facilities have been turned back to the production of the regular line of passenger cars. The war contracts were for trailers for the aircraft division and for one-ton trucks. Hundreds of these trailers were produced to be used in transporting airplanes from place to place behind the allied lines.

GRAY & DAVIS'S FINANCIAL CONDITION EXCELLENT.

Directors of Gray & Davis, Inc., Boston, have voted to pay the one remaining dividend of $1.75 in arrears on the preferred stock, also the regular quarterly dividend of $1.75, both dividends payable April 1 to stock of record March 21.

They have also voted to carry out the agreement made in February, 1918, with the preferred stockholders' committee by which the company agrees to purchase on April 1 all of the preferred stock deposited with the committee at 103 a share and accrued interest. The amount of stock deposited with the committee at the date of the directors' vote was $439,400 out of a total issue of $600,000.

The company has a considerable amount of starter business and lamp orders, but the Cambridge factory is still some distance from capacity operations. Substantial contracts have been booked, which hold out the promise of a considerable expansion in operations before summer.

Recently a merger with the American Bosch Magneto Co., Springfield, Mass., was seriously considered, but at the last moment was mutually called off.

FINDLATER SEES BIG BUSINESS IN EAST.

Returning from the Boston show, James R. Findlater, vice president and sales manager of the Briscoe Motor Corporation, Jackson, Mich., said he was greatly impressed over the prospects of business in the East. He believes that as a result of the wonderful stimulus of the Boston show the East this spring will absorb all the cars that can be sent into the territory.

STAGE COACH LAND MARK RAZED FOR GARAGE.

Providence, R. I., is about to lose its last land mark in the history of the romantic stage coach and tavern days. After being devoted to a stable for more than a century, the buildings at Dorrance and Orange streets, now occupied by the Norton Taxi Motor Co., are to be razed, to make room for a modern garage for the Norton company.

This building was originally used as a posting stable between Boston and New York and for many years was a stage freight house. Tradition sets the date of the erection of the original portion of the old building as about 1812. It is built of brick, stone and plaster.

The stage office was at one side, and the relays of horses for the Boston-New York coaches were stabled next to the office. A large business was done prior to the opening of the Boston and Providence railroad in 1835.

DETROIT DORT MEN ISSUE SALES CHALLENGE.

Salesmen of the Baker-Fisk-Hugill Co., Detroit, distributor for Dort cars, have challenged all Dort dealer organizations. They have put up a purse to back their confidence that they can sell more Dort cars in the Detroit territory in the next six months than any other dealer organization can sell in the same length of time in any other part of the country.

The one condition is that the distributing firm will not be allowed to put up the stake for its salesmen. The men must dig down individually and subscribe the purse. The winning organization will take the entire pot.

The Detroit sales force is hoping that every Dort dealer organization will get into the contest. Detroit, mecca of motor cars, offers great competition, but the Dort salesmen there are optimists and hustlers.

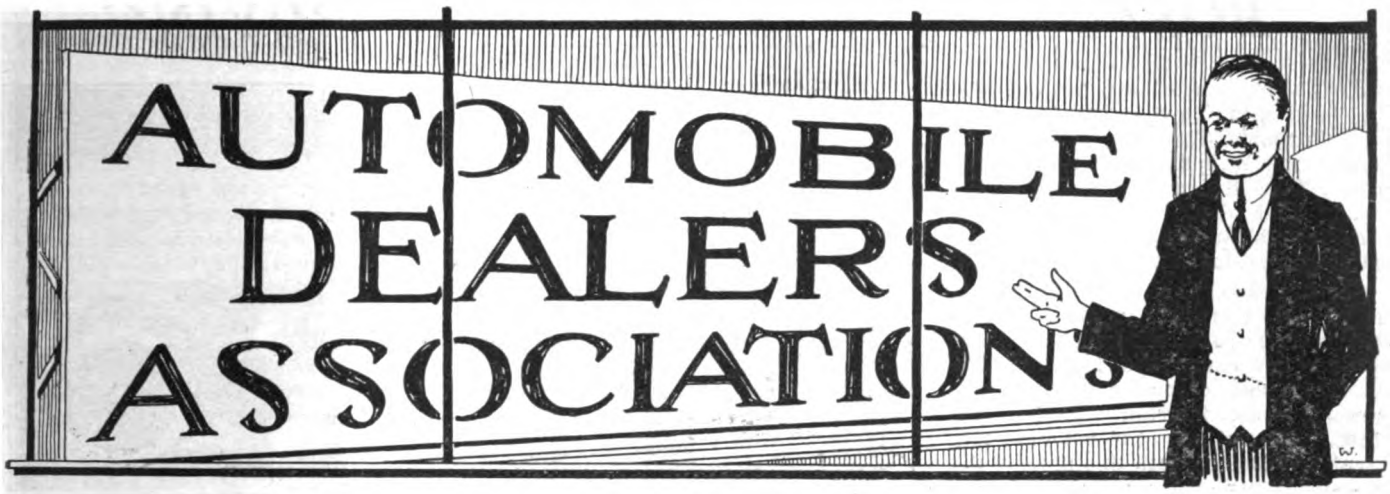
CONTRACTS FOR EQUIPPING FRENCH AUTO PLANT.

F. E. Norris, for some years connected with the Carnegie Steel Co. in a managerial capacity, and who was appointed several years ago general manager of the open hearth steel plant to be erected by M. Berliet at Venissieux (Rhone), France, has placed some contracts in this country for the equipment of this new plant, the output of which will be used entirely in the manufacture of automobiles. A 2000 horsepower flywheel motor generator set for driving the blooming mill will be furnished by the Westinghouse Electric and Manufacturing Co., and this company also has the contract for the auxiliary motors for the blooming mill.

HUDSON REPRESENTATIVES.

Joseph E. Simpson and F. T. Bachman have been appointed New England representatives of the Hudson Motor Specialties Co., Philadelphia.

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New York City

NEW YORK CITY is to have a better social organization for the motor vehicle trade. The Automobile Dealers' Association has arranged to take two floors of the building at 1845 Broadway, and will establish club quarters there. Members of the Motor Club, the Motor Truck Association and other clubs not already registered as dealer members of the A. D. A. will be eligible as associate members of the new club. It will do away with some of the duplication of activities of the existing clubs, none of which now has any real club life.

There long has been need in New York for just the sort of organization that is now under way. The financial success of the show conducted by the dealers made available funds for the realization of plans that long have been held by leading spirts of the Automobile Dealers' Association.

The lease on the premises starts May 1 and no time will be lost in getting the place ready for club purposes. It is hoped that the new club rooms will draw all the automobile dealers together. There will be restaurant, reading and meeting rooms.

The dealers have had an incorporated association for nearly a decade, but it has always lived in a hotel. Visiting automobile dealers have often expressed their surprise when told that the New York automobile merchants did not "herd" well. The new club plan is expected to prove a binder that will join and hold them together.

At a recent meeting of the board of directors of the association, Charles M. Brown was re-elected president, William C. Poertner was re-elected vice president and William Parkinson was re-elected treasurer. The new board of directors consists of H. R. Bliss, Colt-Stratton Co.; C. M. Brown, Winton Co.; H. J. DeBear, Maxwell Motor Co.; R. J. Gilmore, Packard Motor Car Co.; C. H. Larson, Cutting-Larson Co.; William Parkinson, William Parkinson Motor Sales Co.; William C. Poertner, Poertner Motor Car Co.; A. C. Southworth, Buick Motor Co.; W. D. Stewart, Willys-Overland, Inc., and Walter A. Woods, Van Cortlandt Vehicle Co.

The Motor Club, which was organized some years ago and which has been supported by a handful of the dealers' associations, now seems doomed to close its hole-in-the-wall on 58th street. When the new club rooms are opened those who keep the motor club alive will automatically move and there will be little reason for existence for the Motor Club.



Charles M. Brown, President, Automobile Dealers' Association of New York City.

At the same time the directors of the dealers' association do not intend, apparently, to take over the Motor Club as a body. There will be two or more classifications of members, and those members of the Motor Club who care to may become associate members of the association and enjoy the benefits of its new quarters.

N. A. D. A.

The National Automobile Dealers' Association's programme of Sunday closing was not a merger with the blue laws, according to F. W. A. Vesper, president, but an effort to take the automobile dealer out of the class of the livery stable keepers, corner grocers, country barbers and the like. Before the armistice the dealers voluntarily closed upon request of the War Service Committee. There never was an order to close. The N. A. D. A. advocated Sunday closing because it would help the dealers.

Philadelphia

Louis C. Block is the new president of the Philadelphia Automobile Trade Association. Other officers are: Vice president, Lee J. Eastman; secretary, H. B. Harper; treasurer, J. E. Gomery.

With the retiring president, A. E. Maltby, and J. H. Fassit, C. R. Cunliffe, L. S. Bowers and J. Sweeten, Jr., these officers complete the roster of directors. Mr. Block has held the presidential reins on several occasions in the past.

DEALERS OVERCOME OBSTACLES.

Oklahoma City dealers received no encouragement from the Chamber of Commerce when they announced that they would erect a temporary building, 200 by 70 feet, for their show this spring. They were told that their plans were practically impossible of execution. But the dealers went ahead without outside assistance, put up the building, got around the fire law restrictions and overcame all other obstacles. Every foot of exhibit space was sold and the show was a wonderful success.

OPPOSE LICENSE BILL.

Massachusetts motor car dealers will have to do over again much of the work that they had already accomplished in opposing the bill recommended by the special commission on motor vehicles, which proposes to require dealers who handle used cars to take out licenses, and which also prohibits the sale of a used car without previous notice to the Highway Commission and to the local police. This matter has been before the Committee on Roads and Bridges of the General Court and has been considered at hearings and conferences. Now that committee has secured the transfer of the bill, which is included in House bill 1450, to the Committee on Legal Affairs.

The motor vehicle dealers are strongly opposed to the passage of this bill, the proponents of which urged it as a means of preventing the theft of motor cars. The dealers assert that it is an unwarranted interference with their legitimate business, and they do not like the idea of being classed with junk dealers. At a recent meeting the Boston Automobile Dealers' Association voted unanimously to oppose the bill.

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BOSTON SHOW STIMULATES BUYING

BOSTON'S annual automobile show served to stimulate buying in New England. The show as an exhibition, industrial in character, proved even greater than the most sanguine of the dealers had dared anticipate. There were close to 250 machines exhibited and the average value ranged about $2000.

War time was not conducive to launching in new enterprises in the motor vehicle industry, and, consequently, there were few new cars in the show. The Essex, shown this season for the first time, attracted wide interest. Another car which, while not new, had not been represented in Boston until this time, is the Brewster, a high-priced car that was exhibited by George W. Canterbury, Inc., along with the Crane-Simplex and the Holmes. A third new car was the Anderson, shown by the W. L. Russell Co.

It was a cause of regret to the Dodge Bros. Boston sales organization that it was impossible to exhibit the new model sedan. A car could not be obtained from the factory in time for the show. The new Metz Master Six was also missing, but was on exhibition at the salesroom of the Metz Sales Corporation at 915-921 Boylston street.

Unpleasant weather failed to keep away the crowds, and on some nights the doors had to be locked early. The decorations were unusually pretty. There were scores of exhibits of accessories. President J. H. MacAlman of the Boston Automobile Dealers' Association, under whose management the show was held, said:

"This was the greatest motor show in all history. And I mean that as not only applying to Boston, but to the entire country. Never in all the 20 years that I have been selling motor cars has there been such genuine interest and actual sales as there were at this year's show."

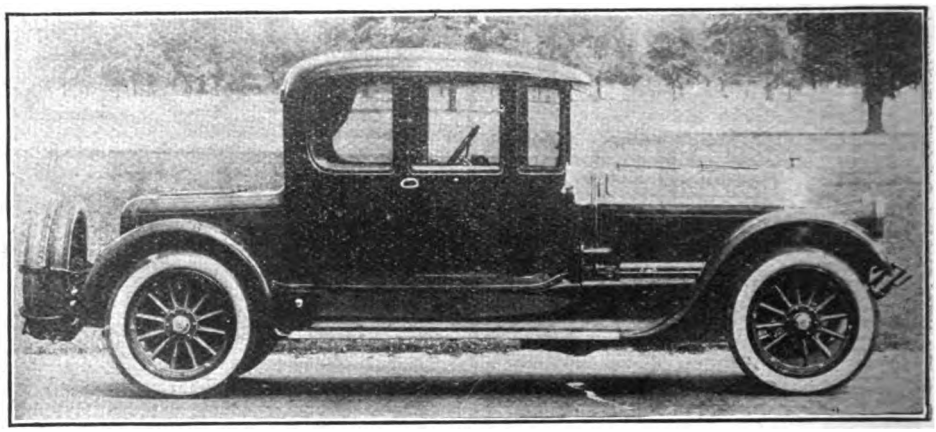
Some of the cars displayed had been refinished and reupholstered in Boston. This was particularly true of the special, five-passenger Bretton Woods model. It had automobile cloth seat covers, wire wheels and a Victoria top. Another special was the Berkshire roadster, which had upholstery of blue fabric and which was painted a dull blue. The car was equipped with wire wheels.

A coupe in which the driver's seat was staggered and in which a fourth passenger could be accommodated on a swinging seat was also shown, as well as a standard five-passenger touring car upholstered in leather.

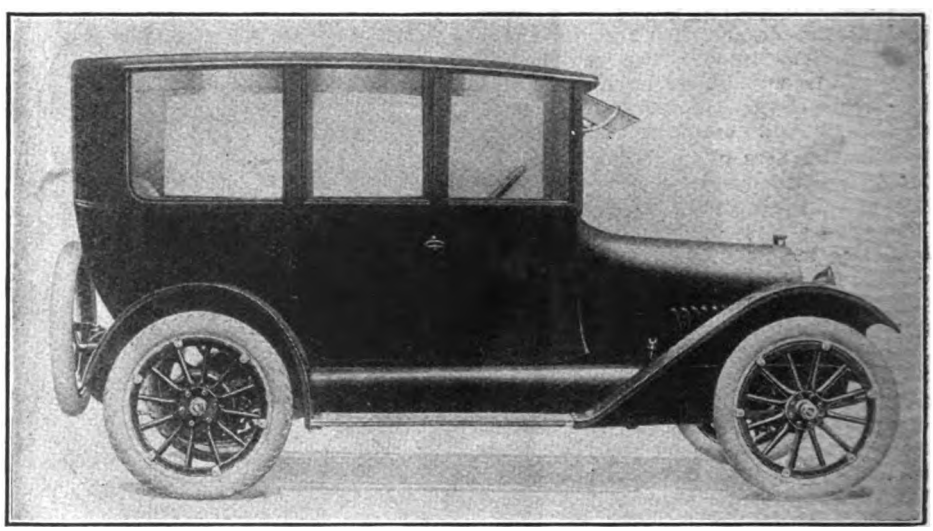
The fifth machine displayed was a five-passenger sedan in which the upholstery was a rich, heavy fabric, gray in color. Like the coupe, the body top had distinctive lines, including beveled corners. The interior hardware was dull finished silver.

Pierce-Arrow.

The Pierce-Arrow display by the J. W. Maguire Co. included something new in touring car upholstering, as shown in a standard seven-passenger touring model. The seats were finished in unpleated, black leather. The rear seat and back were done in three sections, much after the style furniture makers use in upholstering davenports.



Pierce-Arrow Model 48 B Coupe.



Chevrolet Model F-B Sedan.

A seven-passenger limousine lined with gray velour and with oxidized hardware was displayed—also a three-passenger coupe which had an extra seat for a fourth passenger, a four-passenger roadster and a five-passenger touring car.

A noticeable feature of the Pierce-Arrow equipment was that on each steering post was one of the old time horn bulbs, provided for emergency if the electric horn becomes inoperative.

Elgin.

One of the most attractive of the new cars was exhibited at the show by the David P. Virr Co. It was a four-passenger sport model, an Elgin, known as the Victory Scout. The bevel edge straight line body and effectively slanted windshield gave the car a distinctive appearance, which was further emphasized by the striking finish of special Elgin deep red.

The chassis was finished in black and the radiator, fenders and running board shield in black enamel, the wheels having natural wood finish. The outside handles were nickel plated.

The close fitting doors, the Motometer and the new style top with plate glass lights made the appearance of the car complete in detail. The upholstery was machine buffed leather and the cowl board and steering wheel were both mahogany.

Chevrolet.

The Chevrolet exhibit of the Chevrolet Motor Co. of New England included the 4-90 model in a five-passenger touring car and a sedan, which had a divided front seat and removable pillars for the windows. The sedan had its fuel tank at the rear, with vacuum feed to the carburetor, while in the touring car, as well as the runabout model, the fuel supply was beneath the driver's seat.

Briscoe.

Only one type of Briscoe machine was shown by the New England Velie Co., the distributor in the New England section. This was the standard touring car of 105-inch wheelbase, and the 1919 model showed a number of refinements.

The Briscoe factory is unable, because

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of government work, to produce enclosed cars for several more weeks.

The Briscoe is sold at a price which includes freight, war tax, registering the machine and filling the oil and gasoline tanks.

Dodge Bros.

The Dodge Bros. cars, exhibited by the Henshaw Motor Co., were shown in a touring car, a runabout, a coupe, a town car and two types of sedan. The new sedans have four doors, with removable pillars, giving the passengers an uninterrupted view and plenty of light and air. One of the sedans shown had a special cushion body, as did also the town car, which was upholstered in gray velour with fittings of white. The body of this car was gray, with black hood and trimmings.

Oakland.

A new sedan and a coupe were the features of the Oakland Sensible Six exhibit. Both the sedan and the coupe were equipped with heaters, which utilize heat from the exhaust pipe. Ventilation may be had by opening the windshield and one of the door windows sufficiently to permit a circulation of fresh air through the car.

The body constructions of the sedan and the coupe have been changed, solid center posts having replaced the removable supports used in former Oakland models. These tend to neutralize the road shocks. The two cars were painted in Oakland blue, with fenders and top finished in black, and were upholstered in gray automobile cloth in harmony with the carpet, curtains and other interior trimmings. Windows may be raised and lowered at will, while there is illumination by a dome light. The interiors are roomy and the seats spacious and comfortable.

No radical changes have been made in the chassis. The 44 horsepower, overhead valve engine is continued without radical change. The Oakland five-passenger touring car and the roadster were exhibited.

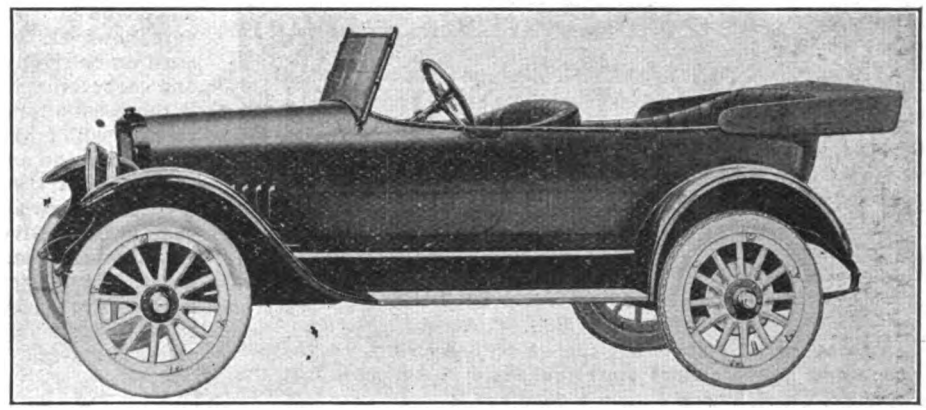
Saxon.

The Falk-Baker Co. in exhibiting Saxon cars showed a chummy four roadster and two touring cars of different color combinations. No closed models of this make will be available before summer because of the government work at the factory. The Saxon car has a six-cylinder Continental engine, Timken axles and bearings, spiral bevel gears, Fedders radiator, Remy ignition and Stromberg carburetor.

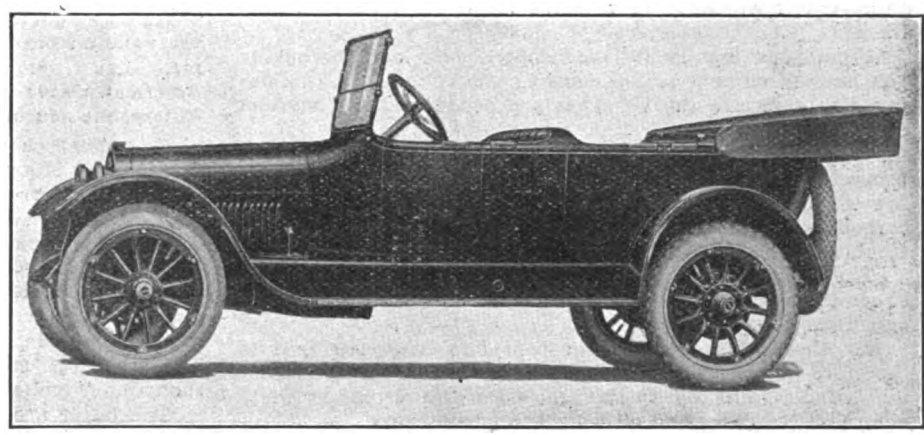
Cunningham.

Prominent among the larger cars at the show were the two Cunningham models exhibited by the Boston branch of the James Cunningham Sons & Co. The cars shown were a six-passenger touring model and a seven-passenger touring sedan.

The sedan was upholstered in shadow stripe broadcloth and the hardware and fittings of the interior were simple in design. In the driver's compartment a mirror was fastened to the middle of the top of the windshield to reflect the roadway through the rear window, giving the driver a view of what is behind.



Allen Model 41 Chassis with Five-Passenger Touring Body.



Buick Model H-Six-49 Seven-Passenger Car.

The touring car had a Pantosote top and deep, wide seats. In addition to the models at the show the series includes a four-passenger sedan and a special raceabout with a guaranteed speed of 85 miles an hour. Several choices of color combinations are offered on new orders.

Auburn.

Two Auburn models were shown by the F. A. Dutton Motor Co., West Somerville. One was a four-passenger tourster in Auburn gray, with white wire wheels. The upholstery was leather. The other car was a five-passenger touring model painted maroon. Each has a wheelbase of 120 inches.

The Auburn line includes a sedan and a coupe, although these types were not in the show. The Auburn radiators are high and well proportioned, while the hood comes back in easy, straight lines to the dash, which extends high enough above the body sides to give a well balanced effect.

The body has a slightly beveled edge and the curve of the fenders is so designed to complete the effect. The new ideas incorporated in the Auburn include an enclosed robe rail, set in the rear of the back seat and covered by a Circassian walnut door that swings outward from the bottom.

Dort.

The Dort exhibit included a cutaway chassis and two touring cars. Using the standard Dort chassis as the base of all models, the Dort designers have prepared for a variety of body styles and equipment to meet every possible requirement.

The five-passenger touring model has long, easy riding cantilever springs, plenty of body room and a pleasing design. The upholstery is deep tufted. There is a one-man top attached to the windshield, with side curtains. The windshield is double and adjustable. The equipment includes a speedometer.

Templar.

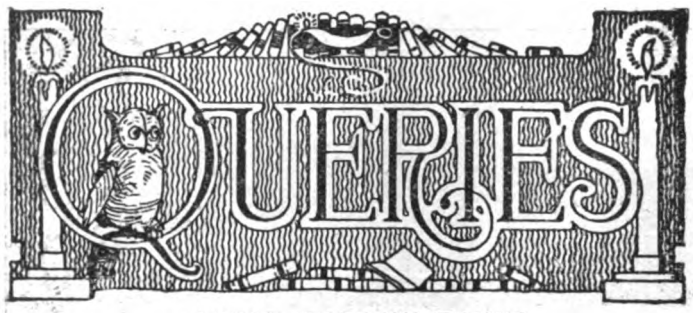
The Mitchell-Lucas Motor Co., whose display occupied all of Paul Revere Hall in Mechanics' building, showed four models of the Templar car. The exhibit included a sedan, a touring car and two roadsters. A two-passenger touring roadster had unusually distinctive lines. The seats were staggered four inches.

When the top is removed the back rail slips down and becomes a hand rail, or the rear section may be left up as a dust shield when the roof section is removed.

The baggage compartment back of the seat provided room for a suit case, as well as the demountable top, the tool kit, crank and jack. The body was full hand hammered aluminum. There were no doors, but an aluminum step, mounted on the outside of the body, giving easy entrance. The seats were deep and comfortable, that at the right side having a foot rest in front of it. The leather upholstery was detachable, with choice of either red or black.

A kodak and compass are regular equipment of this Templar model and are fitted into a compartment in the side of the body. Two extra wire wheels are carried in a well sunk in the rear deck.

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CANNOT START HIS ENGINE.

(G. W., Buffalo, N. Y.)

I have a 1915 Chevrolet car. I put new rings on the pistons and now I cannot start the engine. Am sure that the timer is all right and I have a good spark.

I will state that I did not spot the rings in the cylinders. Kindly let me know why this engine will not start? Do you think that I will have to take the rings out again and spot them?

From your inquiry its hard to tell just how thoroughly you have fitted your piston rings to this engine. The following directions are the usual shop practise of the Chevrolet dealer.

Too much stress cannot be laid upon the importance of properly fitting each piston ring. It is safe to say that very few consider it important, and as a result loss of power, badly carbonized valves and pistons, piston slaps and other cylinder troubles result.

The purpose of a piston ring is to fill up the space between the cylinder walls and the piston, so as to prevent leakage of gases.

As these gases are under considerable pressure, it is therefore necessary that the rings not only fit snugly around the cylinder walls, but in the grooves of the pistons as well; otherwise the gases and oil work behind the rings.

To properly fit new piston rings, proceed as follows:

First. Slip the ring into the cylinder, pressing it down about half way into the bore (Fig. A). See that the ring is "square" with the cylinder walls; that is, its plane should be at right angles to its axis.

Second. Secure a narrow strip of brass or steel three one-thousandths of an inch thick and slip it between the two edges of the split in the ring. Make sure that the ring is resting in the cylinder in the same position that it would were it in the piston, then withdraw the gauge.

For a properly fitting ring there should be a slight resistance, that is, you should feel the edges of the ring drag on the gauge. If the space between the splits is less than this, remove the ring and with a very fine file dress the edge until proper clearance is obtained. Be careful not to round the edges of ring. Keep the file flat. Fit each ring separately.

Third. With a scraping tool carefully remove all particles of carbon from the faces of the ring grooves in the piston.

Fourth. Slip the back side of the ring into the groove (Fig. B) and roll it entirely round the groove. If the ring is the proper thickness you should feel it drag slightly in the groove. If it is too loose, try another ring. If too thick, fasten the ring to a flat board (Fig. C), then lay a sheet of very fine emery cloth on a flat surface. Lay the board, ring down, on the emery cloth and with the hand resting lightly on the board slide it across the emery. Be careful to put the pressure on the board evenly, so as to remove an equal amount of metal from the entire surface of the ring. Remove the ring from the board and try the fit, repeating the grinding operation if necessary.

Fifth. Slip the rings into their grooves, starting with the lower ring (Fig. D). Be very careful not to injure the edges of the ring, as these must not be broken in any way; otherwise trouble will result.

In slipping the pistons back into the cylinders use extreme care. Take your time and do not force the rings into the bore. Compress the rings with the fingers until they enter the cylinder easily.

The splits in the three rings should not be in a vertical line, as the gases could leak by more easily. Therefore stagger the splits so that they will be equidistant around the circumference of the piston.

If you have followed the above directions faithfully there should be no reason why your engine should not start. Be sure, however, that the wiring on the cylinders is in its proper position on the plugs and that you have gasoline in your tank and carburetor. Your engine should start without any trouble if these conditions are right.

You will probably notice that your motor does not seem to develop the amount of power that it should at first, it will take at least 100 miles of driving to smooth up the rings to give you anywhere near the original compression that you shou ld have. Give the engine plenty of oil during this period, as all depends on the care you use at this time, both in driving and in lubrication, how well your motor will run in the future. Care used at this time means long life to the motor without the many small troubles that are so common where one is careless.

WANTS TO REMAGNETIZE MAGNETS.

(F. G. D., Oswego, N. Y.)

Will you advise me how to make an equipment for recharging magnetos. This has been done quite extensively in the aviation branch in Europe so our returned soldiers tell me. Also I am curious to know what has become of the American sleeve valve motor, illustrated and described in the Automobile Journal last winter.

A magnet charging device, which was described in the Commercial Motor, utilizes storage batteries as a source of magnetizing current. The magnets are composed of soft iron core pieces about six inches long and one inch in diameter. The base is constructed of mild steel plate, the cores being fastened to the plates by screws or by turning down the ends of the cores and threading them to fit the holes in the base plate. Before screwing down the core pieces they are wound with number 22 gauge insulated wire, the ends being left free. The wires are connected to a pair of storage batteries as shown at A and B in diagram.

The latter are so connected that the polarity of the soft iron cores are north and south respectively. Enough of the wire is wound on to have coils of about two inches in diameter. If the core shows signs of overheating, low voltage lamps should be placed in the circuit as resistance. The voltage of the lamp to be used depends entirely upon the voltage of the battery used to energize the magnet. It is stated that the magnets will be charged if they are merely placed in contact with the energized cores until they have absorbed sufficient magnetism to enable them to sustain a weight of 10 pounds, after which they are ready to be used. This is shown at A in cut.

Another type of electro magnet designed to operate on 110-volt current is shown at B. The cores are of soft iron, one inch in diameter and 8½ inches long. They are drilled at the bottom for retaining screws which are intended to keep them in contact with a base plate of steel 4½ by nine inches. Two blocks of steel 1¾ inches by two by four inches are drilled to receive the cores and have such screws in the sides so they can be clamped tightly against the cores to form pole pieces. A brass tube about 1/16 inch thick at the side, having flanges at each end projecting over to hold fiber insulating plates as shown, may be turned to the dimensions indicated in a lathe or may be made up of sheet stock if desired. The hole through the center of the brass spool is of such a size as to permit the core to fit freely in its interior.

Besides this equipment 22 pounds of No. 20 B and S gauge insulated copper wire will be needed. Eleven pounds is wound around each brass tube, winding one coil in one direction and the other the opposite way. Leave six inches of wire when starting to wind the coil in order to make a connection between them. After both coils have been wound shellac them thoroughly and wind insulating tape over the outside. The coils are then fastened to the iron base plate, the coils are slipped over the cores and the pole pieces attached to keep the coils in place. The view of the completed magnet is clearly shown in the assembly presented at B. This can only be used with 110-volt direct current.

Before recharging the generator magnet it is important to test the polarity of the electro magnet and vice versa. It is not difficult to ascertain the polarity by using an ordinary compass or magnetic needle, the marked pole of which will point toward the north. Once the polarity has been deter-

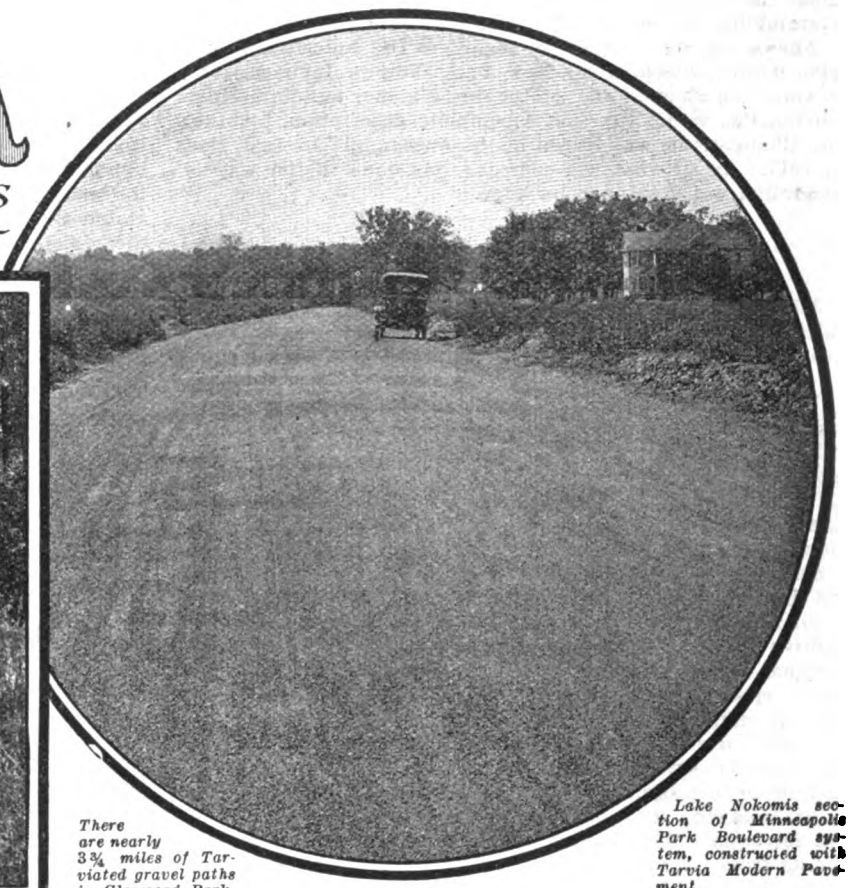
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Tarvia

Preserves Roads
Prevents Dust~



There are nearly 3¾ miles of Tarviated gravel paths in Glenwood Park.



Lake Nokomis section of Minneapolis Park Boulevard system, constructed with Tarvia Modern Pavement.

Why Minneapolis adopted Tarvia for her park paths and boulevards——

THE City of Minneapolis is justly famous for its fine lakes and the beautiful river gorge, all of which have been incorporated in its Park system.

The boulevard system encircles the entire City connecting all the principal Parks.

The beauties of the parks themselves are revealed by a network of sylvan paths like the one illustrated above, attractively surfaced with gravel or crushed stone in keeping with the landscape. As these paths are built with Tarvia, they cannot wash away with the rains: they are free from weeds: and they are inexpensive to maintain.

As for the boulevards, the Annual Report of the Park Board says, after giving figures obtained from its own experience with Tarvia:

"We know, therefore, for a certainty, that we can construct a tar-macadam roadway and properly maintain it for 20 years, at less cost than any other modern pavement. We are also convinced that during that period of 20 years, this roadway will be in a highly satisfactory and serviceable condition, and we believe that similar good results can be obtained at very nominal cost for an indefinite period thereafter."

Tarvia has been adopted for the construction of the new Nokomis section of the Boulevard system. This was only after extensive examination of Park roadways in a large number of cities in the United States and Canada.

The Report says:

"The observations made, removed all doubts as to the qualifications of tar (Tarvia) as a desirable and efficient binder, and the efficiency of the modern penetration method of construction. The latter question was really the only item on which we were not previously quite satisfied and convinced."

Here we have the personal experience of Mr. Theodore Wirth, the superintendent, and Mr. A. C. Godward, the engineer, covering a period of 11 years, backed up by the testimony of many others engaged in the same line of work.

Illustrated Tarvia Booklets sent on request.

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mined the poles may be marked in any desired way, usually by stamping the north pole N and the south pole S.

Answering your inquiry in regard to the American sleeve valve motor, shown at the New York show in January, 1918, by American Sleeve Valve Motor Co., Widener building, Philadelphia, Pa., would say that a complete description, together with illustrations, was shown in the Automobile Journal, Dec. 25, 1917. As to what the company has done in the way of production we have no knowledge.

INSTALLING AN AMMETER.

(H. C. N., Haverhill, Mass.)

Kindly give me the wiring diagram on Model B-24-1914 Buick car. Would also like to ask if you would consider it advisable to install an ammeter and the proper place to cut it in?

Without making a change in the generator it will be impossible for you to connect an ammeter with this type of machine. On the side of the generator you will find two finding posts, one and two, which are connected by a brass strap, A. This strap must be cut or removed. On some of these machines this strap is on the inside of the frame or case as shown at B in the accompanying sketch. In the latter type it is necessary to remove the motor generator from the engine and disassemble it in order to cut the strap. After the strap is cut a tap is made on the wire from No. 2 terminal to the positive side of the ammeter, and a wire run from the other terminal of the ammeter to No. 1 terminal. The meter for this purpose should be of the center zero type, reading at least 10 amperes discharge and 30 amperes charge. No change of wiring is necessary. Before removing the motor generator be sure to mark all connecting wires in such a manner as to make it possible to properly reconnect them.

By following the above directions we feel sure that you will have no difficulty in attaching and getting the best of results from your ammeter.

BENCH HOLDER FOR MOTORS.

(C. J. S., Chicago, Ill.)

Can you suggest through the columns of the Automobile Journal some simple devise for holding a starting motor or generator to the work bench for testing? Something that can be made handily.

A fixture that is very useful for this work is made as follows: Procure a block of wood about six inches wide, four inches high and about 12 inches long. Hollow the center of this block rounding, to fit the underside of motor. This block is to be the bed for the motor. Procure two bolts, 16 inches long of half-inch wire. Bore holes in the bench to receive these bolts 13 inches apart. Set the block between them and bring the bolts up through the bench. A piece of flat stock is now obtained, 18 inches long, six inches wide and one-half inch thick. Drill two five-eighths inch holes in this 12 inches apart. Drill a one-half inch hole in the center, half way between them, and thread this for a one-half inch machine bolt.

Procure a piece of flat stock six inches long, four inches wide and about three-eighths inch thick. Drill into this at the center one-quarter inch deep. This is to take the end of machine bolt and keep the bolt from slipping on the motor case. Heat this piece of stock and shape it to fit the top of motor housing. Place the motor in the block and slip the plate over the long bolts, with the adjusting bolt resting in the depression in C on the top of the motor. Tighten the nuts on the long bolts till the adjusting bolt rests firmly in the depression. Then turn the adjusting bolt down till the motor is held firm. This outfit is shown in the diagram at A, B and C.

LIGHTING TROUBLES ON A SAXON SIX.

(I. J. B., Rochester, N. Y.)

Kindly tell me through the columns of the Automobile Journal why the dimmers of my 1916 Saxon Six fail when the switch is turned to the dimmer point? The lights burn as bright as when it is on the bright point.

The starting and lighting system of Saxon cars is what is known as the "Wagner" starting motor with "Bendix" drive. The Wagner dynamo is chain drive. The system includes a Remy battery and coil ignition. The wiring is a six-volt single unit system.

Your inquiry would indicate that the trouble was probably in the small resistance spool located on the back of the dash, and this coil has become short-circuited. Would suggest that you loosen the screws that hold the ignition and light switch to the dash. After removing these screws pull the switch towards you as far as the wire will allow. Examine the wiring of the dimmer circuit from the switch to the resistance and here you will probably find your trouble. It may be that the binding screw that holds this dimmer circuit wire has become loose, allowing it, through the jar and vibration of the car, to swing over and make contact with the wire on the bright light circuit. This would cut out the resistance, giving you the same degree of light on both switch points. There is little probability that the resistance itself is burned out. This condition would cause a short circuit. If that is the case the only thing to do is to put in a new resistance spool. The accompanying diagram will give you some idea of the wiring system used in these cars. The positive side, as you will notice, is grounded to the frame.

ENGINE STARTS HARD.

(M. R. D., Jr., Bernard, Ia.)

What can I do to start my 1917 Reo Six roadster in cold weather? It runs fine after once started.

This trouble is quite common in cold weather, especially with a car that has been run for several thousand miles day and night driving, such as would be given by a doctor for instance. The cause for this is wear of the pistons and cylinders. The best plan is to attach some form of priming device to the intake manifold. A simple method is shown in the accompanying diagram. It consists of a priming pump on the front of the dash and a small tank on the inside of dash that holds one pint of gasoline. The tank and pump are connected by tubing. From the pump the tubing leads to the manifold, where it is divided by a T. A hole is drilled in the elbow of the manifold parallel with the manifold and threaded for a bushing. Drill a hole and thread the elbow in the other manifold in like manner. Lead the tubing from the T to the bushings in the elbows and fasten securely. Before the bushings are put in place a piece of tubing, somewhat smaller in size and about three inches long, should be soldered to the inside of bushing. To do this you will probably have to open the end of the tube to fit the wall of the bushing. Pinch the other end of this short tube just enough so as to leave an opening about the size of a good sized darning needle. This would cause the gasoline to be forced into the cylinder in the form of a spray and will cause much quicker starting of the motor.

OIL DISCHARGE FROM BREATHER.

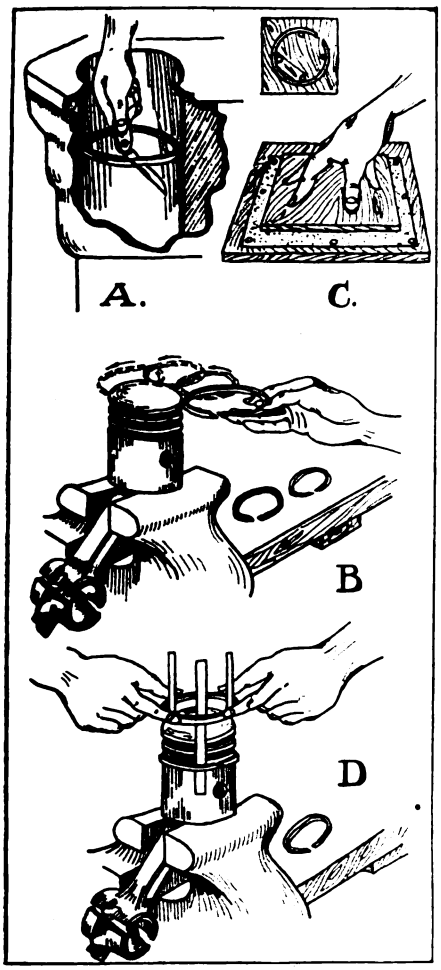
(F. H. B., Chicago, Ill.)

I have a ——— 1916 car. Had new crankshaft put in and even after the oil is sprayed out of the crank case breather and filling spout. When the engine is warm this oil shows up like smoke and condenses on the inside of the hood and runs down on the chassis. Even after putting in new rings, which I was told was the trouble, this fault continued. Am getting from 75-100 miles per quart of oil and 22 miles on a gallon of gasoline this cold weather. Kindly tell me how to correct this.

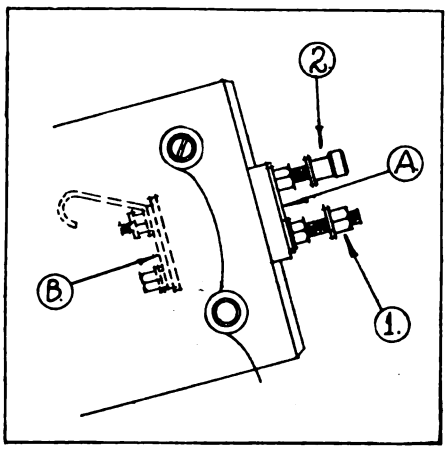
We would think that your trouble is probably caused by too high oil level in the base of motor. The fact that a new crankshaft has been put into this motor leads us to believe this to be the case. The usual custom is to put in extra oil whenever bearings are tightened to insure their wearing in properly. As the rings on your pistons were changed about the same time and you do not notice a blue smoke from your muffler, shows us that the oil is trying to find an outlet, and comes out the breather as a mist, collecting later on the inside of hood, covering it with a film of oil, which later runs down on the chassis frame. You say that you are getting from 75 to 100 miles on a quart of oil further shows us that your motor is not wasting oil at the exhaust.

If lowering the oil level does not remedy this trouble,

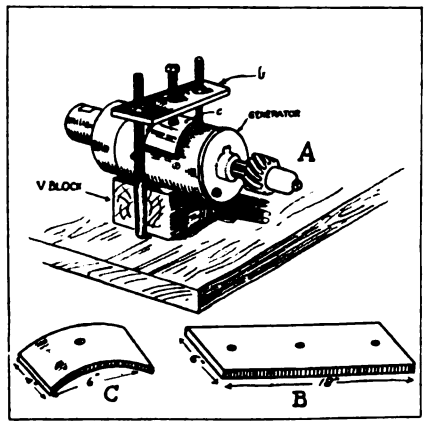
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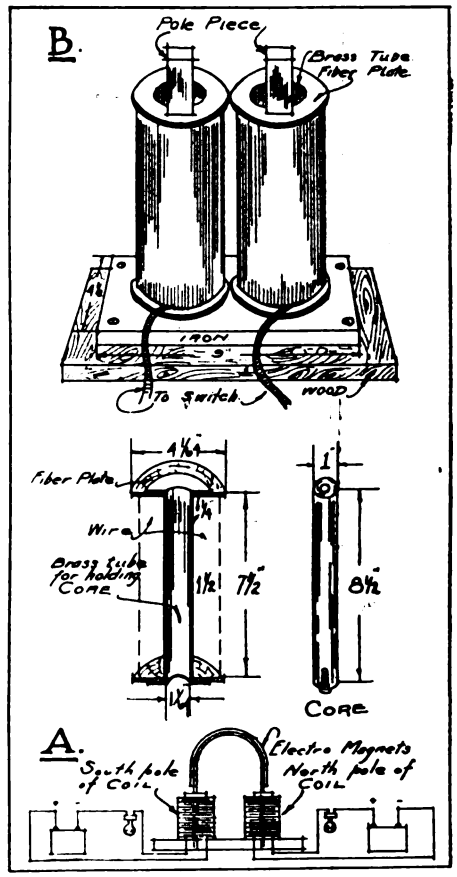
Fitting Piston Rings to Piston and Cylinder on a Chevrolet Car.



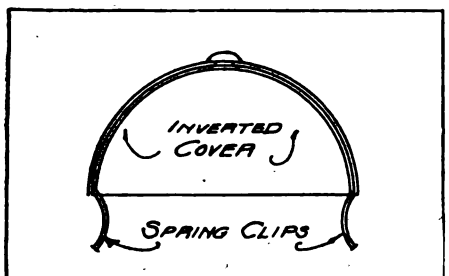
To Make Proper Connections on a Buick for an Ammeter.



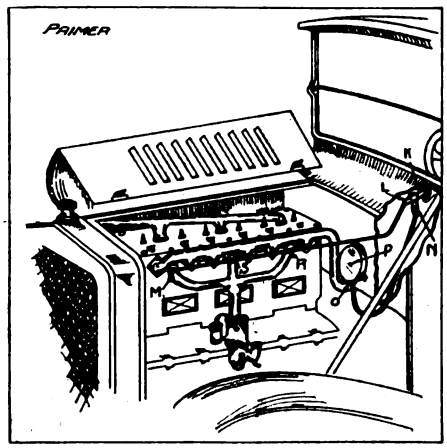
Handy Bench Holder, for Holding Motors While Working Upon Them at the Bench.



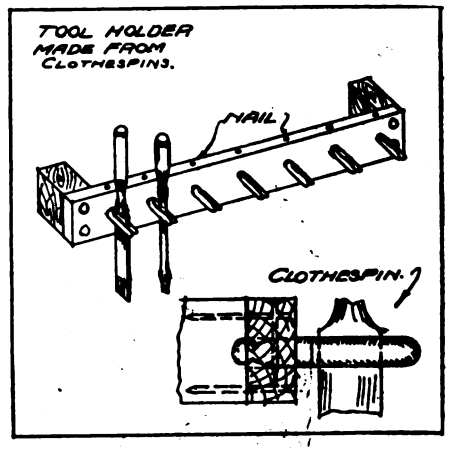
Arrangement of Coils and Connections for Remagnetising Magnets of Magneto.



Type of Cover to Be Used on Top of Breather Pipe to Prevent Oil Discharge.



Priming Device for Starting the Motor of a Six-Cylinder Car.



Home Made Tool Rack for the Private Garage, May Be Enlarged to Suit Conditions.

would suggest that you fit oval covers by means of spring clips to your breather, also a snap cover over the filling spout.

The principle of this device is that in cars of that year provision was not made to prevent the oil being forced out by crankcase compression, as it is at the present time. Before your engine was overhauled and new rings put in, some of your oil was passing by the pistons and out of the exhaust, due to wear in the pistons and rings. Since putting them in this loss of oil was stopped, but you do notice it being forced out at the breather. The cover mentioned above and shown in the sketch is simply a pressed or hollow stamping with the spring clips attached, either at the top by a rivet or at the sides, the clips simply holding it in place with a slight tension on the inside of breather pipe. Space should be left of about three-eighths of an inch between top of the tube and cover for the compressed air to escape. The purpose of the cap is to catch the oil spray and return it through breather pipe to the motor.

The same thing may be done with the filling spout, but a tight fitting cover may be used here as the breather releases the base compression. We feel sure this will help your trouble.

HOME-MADE TOOL RACK.

(C. H. W., Boston, Mass.)

What would you advise as a suitable low priced tool rack for an owner who does his own repairing?

A place for everything and everything in its place is an old motto that is as true today as ever, especially where tools are concerned. Such a rack is very easy to construct, being made from one or more strips of one by two-inch lumber and some ordinary clothes pins. It will be a time saver.

The diagram shows how they are used. A series of holes the size of the pin body are bored in the strip, and into each hole a clothes pin is driven until the legs are through. Secure the pins in place by nailing down through them with wire brads, as shown at A.

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30x3	7.45	8.35	2.15	35x4	15.45	16.95	3.55
30x3½	8.95	9.95	2.40	36x4	15.95	17.50	3.60
31x3½	9.45	10.45	2.45	34x4½	18.45	20.45	4.30
32x3½	9.95	10.90	2.50	35x4½	18.95	20.95	4.40
34x3½	10.45	11.30	2.80	36x4½	19.45	21.45	4.45
31x4	13.45	14.60	3.20	37x4½	19.95	21.95	4.50
32x4	13.95	14.95	3.30	35x5	20.95	23.45	5.15
33x4	14.45	15.45	3.35	37x5	21.95	24.75	5.30

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The highest quality lowest priced lamp produced.

LIST PRICE With Mirror - $6.00
Without Mirror - $5.00

CULVER-STEARNS MFG. CO. Worcester, Mass. Detroit, Mich.

GEARING FORD FOR RACING.

(R. G. K., Manchester, N. H.)

I have a 1918 Ford and I desire to gear this up. I am advised to gear it two to one. Will you kindly advise as to the new gears I will require and where same can be obtained? I have a racing body on the car that holds the road perfectly. Can you give me any information regarding putting in a sliding gearset in a Ford? I would like to know of a practical and economical method.

The standard ratio of the Ford gear set is 3 7/11 to 1. Changes can be made by purchasing the gears, and if you will write the Detroit Radiator Specialty Co., Detroit, Mich., they will supply you the gears you require. The ratios to use are as follows: For racing, 2 4/7 to 1. Fast roadsters, 2¾ to 1. For racing on dirt tracks where a quick pick up is required use a 3 to 1. The 2¾ and 3 to 1 are interchangeable. You will have to change the pinion and the large or differential gear, the driving member. The number of teeth are as follows for the different ratios:

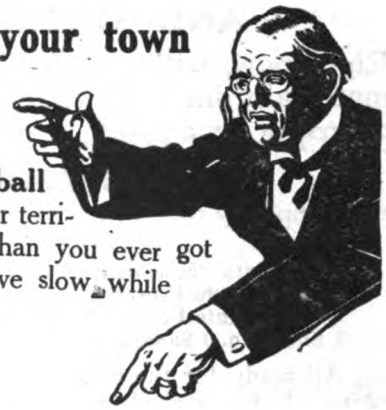
2¾ to 1 gear 36 teeth, pinion 13 teeth.
3 to 1 gear 39 teeth, pinion 13 teeth.
3 7/11 to 1 gear 40 teeth, pinion 11 teeth.
4 to 11 gear 40 teeth, pinion 10 teeth.

The average speeds with these gear ratios are: 2¾ to 1, 60 to 65 miles per hour; 3 to 1, 50 to 60 miles; 4 to 1 varies according to weight, average 25 to 35 miles. A sliding gearset or transmission has been built by Woodward & Rowe, 2125 Michigan Avenue, Chicago, Ill., for the car mentioned. It affords four speeds and is adaptable to all types of Fords. The company will supply you with all data as to prices, etc.

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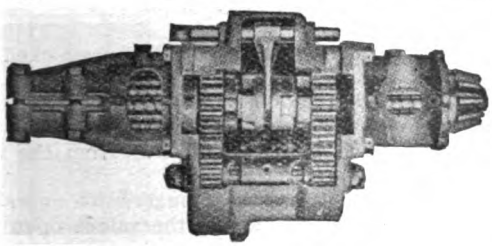
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QUALITY OF PISTON RINGS.

(M. S., Syracuse, N. Y.)

Are the patented piston rings much better than the regular style rings with which gas engines are equipped when leaving the factory? What causes the No. 1 spark plug to foul more often than the other three?

There is quite a difference of opinion regarding the so-called "Leak Proof" rings as to their success in use. If the regular style ring is doing its work satisfactorily, one would be foolish to make the change.

Your trouble with No. 1 spark plug is probably caused by too much oil in the crank case. Carrying this oil somewhat lower will cure your trouble. A cracked porcelain on the plug would cause it to foul also. Try a new plug in this cylinder.

LIGHTS CANNOT BE TURNED OFF.

(H. C. L., Richmond, Va.)

Kindly tell me what is the matter with the lights on my Ford car. They cannot be thrown off at the switch. The only way that I can shut them off is by disconnecting one of the sockets under a lamp.

Your trouble is probably in your switch. If this has been removed recently you may find that in putting it back some one may have used nails instead of the two screws that hold the switch to the dash. We have known cases of this kind where a nail put in this way has gone through the dash and pierced the insulation of the two light wires that enter the switch, causing a short circuit that will make the lights burn as you say your lamps burn in your inquiry.

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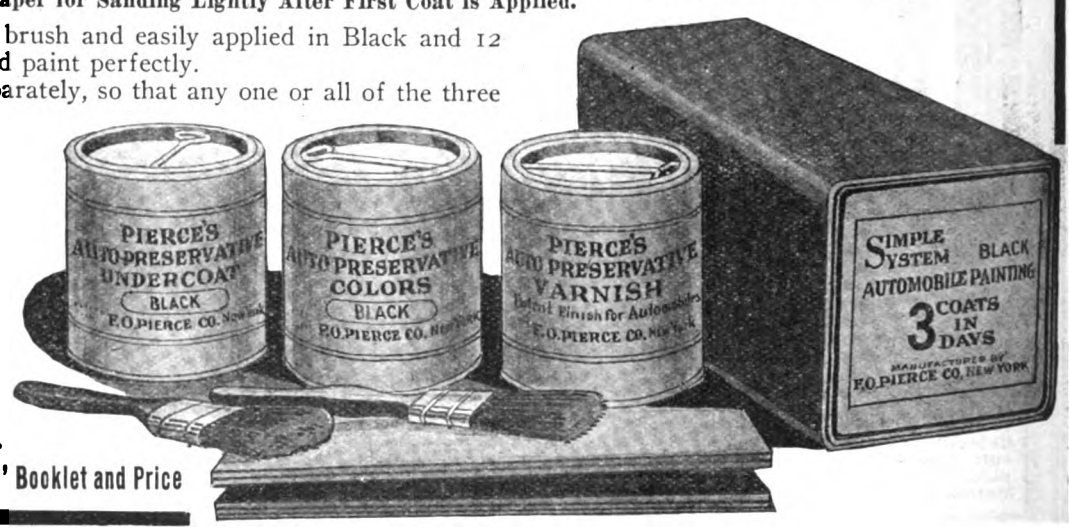
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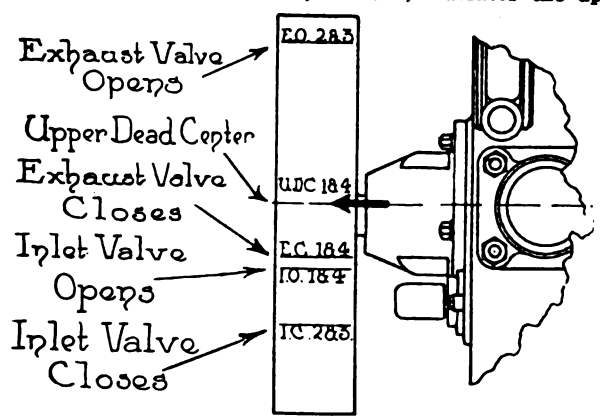
Write for "Simple System" Booklet and Price

TIMING THE MOTOR.

(H. H. M. Westport, Conn.)

Will you please state the correct timing for the 1912 Reo touring car? How can I check up this? I recently had my car overhauled by a local mechanic and there are certain conditions which lead me to believe that the timing is wrong.

The timing for the car is plainly stamped on the face of the flywheel, as shown in the accompanying illustration. The mark I. O., means that the inlet valve opens; I. C., that the inlet valve closes; E. O., that the exhaust valve opens; E. C., exhaust valve closes; U. D. C., 1 and 4, indicates the upper



The Timing Schedule of the Reo 1912 Model Touring Car.

dead center of cylinders 1 and 4, and the mark U. D. C., 2 and 3, means the upper dead center cylinder 2 and 3. These marks indicate what the position of the flywheel should be when the valves open and close. The cylinders in the motor are referred to, beginning at the one nearest the radiator, by the numbers 1, 2, 3, 4.

The first operation in timing is to open the petcocks over the exhaust valves so that the motor can be easily turned over by hand. The first valve to be checked up is the inlet in the No. 1 cylinder. Turn the flywheel until the mark U. D. C., 1 and 4, is nearly in line with the reference point on the cylinder, and then turn it over a little more until the mark I. O., 1 and 4, registers with the reference point. At this point the inlet valve of the No. 1 cylinder should just be commencing to open. By this is not meant that the valve should be partly opened, but just beginning. Having determined that the opening is correct, proceed to check its closing point. Turn the flywheel over until the mark I. C., 1 and 4, is close to the reference point. The inlet valve in the No. 1 cylinder should now be closed.

The exhaust valve in this cylinder should be checked in a similar manner, according to the marks given. Having ascertained that the valve timing for this cylinder is correct, follow the same procedure with the remaining cylinders. A variation of not more than ¼ inch either way from the reference point is allowable.

If after having determined that the plungers are operated by the cams at the proper time that still the valves open because of the space between the plunger and the valve stems, this back lash can be taken up by the adjusting screw at the top of the plunger. However, it is essential that there be a space of about the thickness of the ordinary name card between the push rod and the valve stem when the valve is fully closed.

TIRE VALVE TROUBLES.

When the tire valve goes wrong a surprisingly large number of motor car owners are helpless to put it into working condition again. Yet this important little component is simple in construction and principle.

For the benefit of those who do not understand the valve principle thoroughly, the accompanying illustration showing a valve open and one closed, and the following explanation of its operation will be found illuminating.

It will be noted that the inside of the valve stem is recessed and threaded at the upper end, into which the valve is screwed. At the base of this recess is a shoulder on which the valve stem guide rests. An air passage directly below

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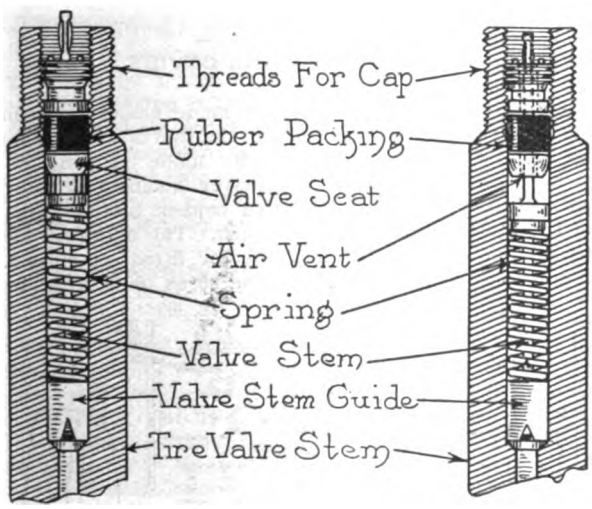
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this guide leads into the tube. At the base of the threaded portion is another seat, on which rests a rubber packing. The



Cross Section View of a Tire Valve.

threaded member of the valve which screws into the stem is hollow, thus allowing the plunger rod to move freely. A cup shaped piece of metal to which the rubber packing is attached fits into the threaded section and both move freely.

This arrangement allows the adjustment of the packing by screwing down on the threaded member. When in position these two parts form a long bearing for the plunger. Attached to the middle of the plunger is a cup like piece of metal to the base of which is attached a fine spiral spring. The guide attaches to the other end of the spring.

The illustration at the left shows a properly adjusted valve which is absolutely air tight. The valve is fully on its seat and the air vent sealed. In the illustration to the right the plunger has been depressed to force the valve away from its seat to allow the air to escape through the vent. When the pressure is released from the plunger the spring forces the valve into its normal position.

When inflating a tire the action is automatic. The incoming air has greater pressure than that already in the tire and forces the valve down. When the incoming pressure is shut off the compressed air in the tube reseats the valve.

Valve trouble may be the result of several conditions. A frequent cause is that the rubber packing has lost its elasticity or has become torn through careless adjustment. Often foreign matter will lodge between the valve and seat. Depressing the plunger a few times will sometimes dislodge it.

The tip of the valve stem cap is usually so formed that it can be used as a wrench for adjusting the rubber packing to its seat.

STOPPING GREASE LEAKAGE.

(L. H. E., Haverhill, Mass.)

Please tell me how to stop grease from leaking into the rear wheel assembly of my car. I have tried washing out old grease from the differential and installing new felt washers and cap.

Leakage of grease around the rear hub brake drums is often due to the use of too much grease in the rear axle housing. It is not necessary to fill the rear axle housing full of grease, even if it will hold three pounds or more. One pound of extra gear compound is enough, as this will stay in the differential housing, and as long as the lower part of the drive gear dips in the grease it will be well distributed to all parts of the differential gears.

If the thrust washers at the sides of the differential are worn they will allow the differential to shift from one side to the other, thus pumping grease out around the rear hubs. This will cause the grease to appear first on the left rear wheel, because the master gear is nearest to the left hand side of the rear axle housing. The only effective remedy is taking the rear axle system apart and the installation of new thrust washers. By reducing the amount of wear ball bearing thrust washers tend to eliminate the leakage of grease around the rear hub brake drums, due to this cause.

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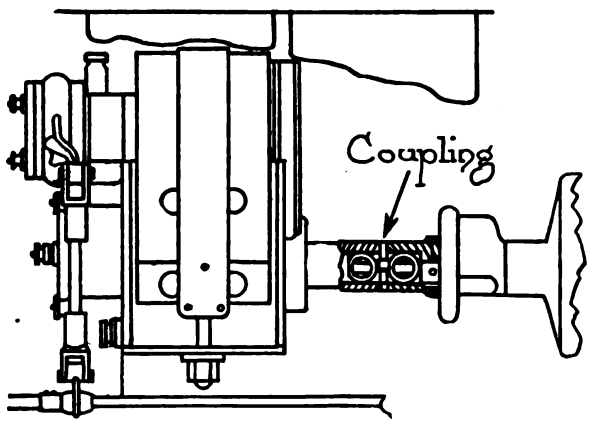
180-182 Massachusetts Ave., Boston, Mass.

IRREGULAR OPERATION.

(W. H., Scituate, R. I.)

I have a four-cylinder ——— touring car which has given satisfactory service for about 1½ years. Recently the operation has been irregular when operating on the magneto and also when operating on the battery. I also notice a knock which sounds somewhat like that produced by a loose tappet. I have adjusted all tappets, however, had the magneto and carburetor overhauled by a reliable repair man and installed a new coil. Compression is good on all cylinders, the valves properly timed and am using ——— spark plugs in each cylinder. There is no short circuit in the ignition cables and all connections are tight. It is not a regular miss and occurs mostly when the speed of the motor is reduced.

From information given, the trouble appears to be of an uncommon nature. It is advisable to examine the connection which drives the magneto. It may be that the coupling on the magneto shaft has worked loose or that the key is loose.

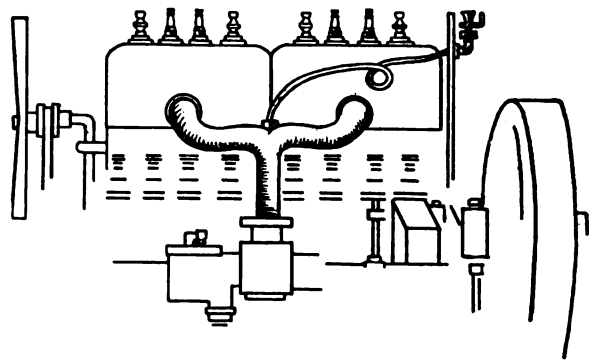


Illustrating How Coupling Is Usually Secured to the Magneto Shaft.

This condition would cause irregular timing, knocking and irregular motor operation. The coupling is usually secured to the magneto shaft by a nut. If the key is loose, it should be replaced by a tight fitting one and the nut securely tightened. The accompanying illustration shows a coupling commonly used for magnetos.

PRACTICAL PRIMING DEVICE.

In cold weather starting can be made easier by priming the motor. This is inconvenient for the driver when it necessitates raising the hood. An easily made priming device which will better convenience the driver is shown in the illustration. Run a length of annealed copper tubing from the top of the intake manifold to the dash. The manifold should be drilled and tapped and a connector fitted as shown. A small coil is then made in the tubing so as to prevent breakage from vibration and the free end carried through the dash. An elbow and priming cock is then fitted as shown. Of course the priming cock on the dash should be higher than the end of the tubing which enters the manifold, as the flow from the tank is by gravity. The device is especially useful, as the cup may be slightly opened to admit auxiliary air to the mixture. Water can also be fed to the motor in this manner for removing the carbon from the cylinders.



Method of Priming an Engine from the Dash.

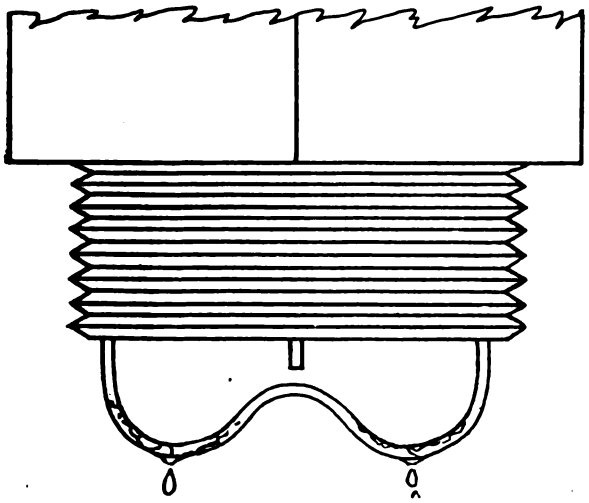
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A SKIPPING CYLINDER.

(T. L. M., Webster, Mass.)

I have a Ford touring car which has been run about 8000 miles. Recently the No. 1 cylinder has given much trouble. At times it will misfire and fire unevenly for five or 10 minutes and then pick up and run smoothly. By cleaning or replacing the plug the trouble is temporarily eliminated, but returns after running about 10 miles. Regardless of the make of plug the trouble is the same. I have installed new wiring and all contacts are tight. Can you suggest what the trouble may be?

It would appear that as the trouble can temporarily be overcome by changing or cleaning the spark plug, the source of trouble is not to be found in the ignition. As the plug dirties readily, it is almost conclusive evidence that an over abundance of oil is reaching the combustion chamber and accumulating on the plug. A remedy worth trying is to fit piston rings that have sealed openings. Frequently an over abundance of oil is splashed into the front cylinder by the



Shell Electrode of Spark Plug Bent Into an Arch to Prevent Oil from Accumulating on Sparking Point.

settling of the front spring, thus causing the greatest amount of oil to flow to the front of the crank case. In that case the spring should be replaced or the front of the car shimmed at the point bearing on the spring. Another simple remedy is to bend the shell electrode of the plug in an arch shape, as shown in the accompanying illustration. Any machinist can make a shell electrode of this type. The advantage of the arch is that the oil contacting with the electrode will flow away from the arch, which keeps the sparking points clean.

WANTS DEMOUNTABLE WHEELS.

(G. F. B., Bristol, Conn.)

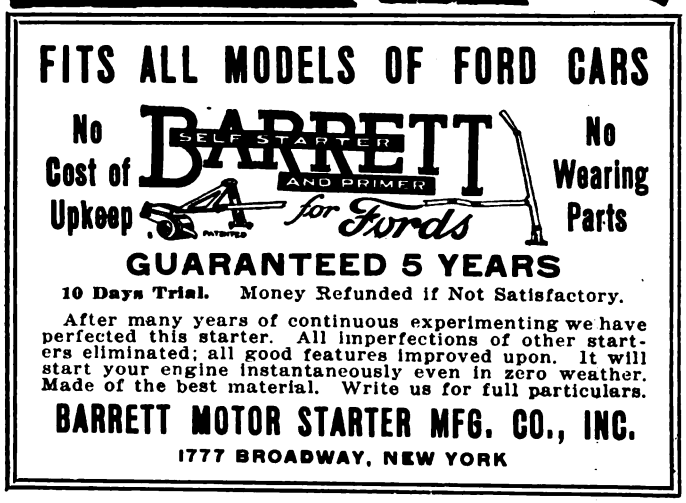
Wish to procure a set of demountable wheels having quick detachable rims for my Ford car. Can you tell me who makes them and why they are made with clincher rims or demountable rims only? Am using 30x3½ inch tires all around and wish a combination that I can get a quick change, either with wheels and tires or tires alone.

We believe it practically impossible to obtain the type wheels and rims that you wish for your Ford car. Nearly all the manufacturers that we know of make this wheel with clincher rim. They probably assume that a tire of this size (30x3½ inch) is more easily changed over the rim as in the clincher type, then by using the quick detachable type. You might be able to have this quick detachable rim put on special for you by some one of the manufacturers. The cost would be probably greater as your order would be special, calling for only one set. If you will write to the following they can tell you what they can do: Hill-Smith Metal Goods Co., 82 Brookline Ave., Boston, Mass.; J. P. Gorman Co., 382 Canal St., New York City; Stone Thompson Manufacturing Co., 1502 Michigan Ave., Chicago, Ill.; A. M. Eames & Co., Framingham, Mass.



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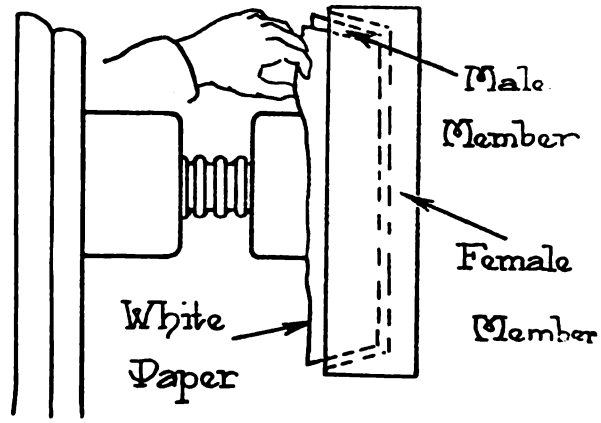


HARSH GRIPPING CLUTCH.

(T. K. G., Newark, N. J.)

My car is a ——— roadster and is equipped with a leather cone type clutch. I recently had the clutch relined and although I have used much neatsfoot oil, there is a fierce gripping action each time the clutch is engaged. The spring tension does not seem to be too strong. What do you think is the matter with it?

It would appear that the leather on the male member of the clutch does not engage for its full width with the female member of the clutch. If the high spots cannot be determined by the general appearance of the leather, the method



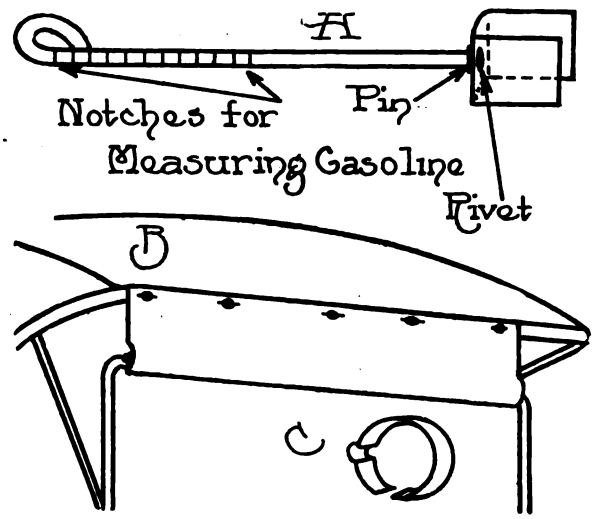
Determining the High Points of a Harsh Gripping Clutch.

shown in the accompanying illustration can be used for the test. Depress the clutch pedal and then insert a piece of white paper between the flywheel and the leather faced portion of the clutch. Engage the clutch and then depress the pedal again. When the paper is removed the high spots will be plainly indicated on it. The leather should then be trimmed to the surface uniform in height.

An easily made preparation for polishing unpainted steel parts of the car is to mix a small quantity of very fine emery with soap paste. This compound will remove rust without scratching the surface.

PREVENTING DRAFTS.

The windshield used on the Ford car does not snugly fit the top and in cold weather a draft enters through this gap. An effective protection is afforded by the device illustrated in Fig. B. Trimmers' clamps are screwed into the bow of the top. The filler (B), which is made of canvas, is secured to



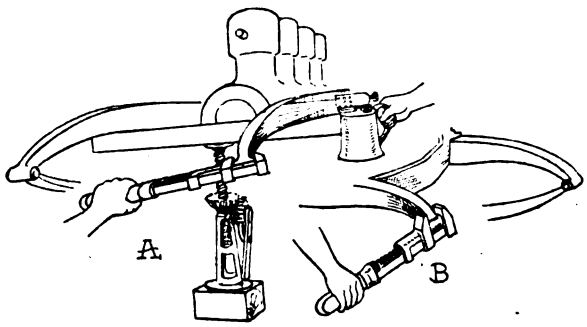
A, Handy Instrument for Ford Car Owners; B, Device to Check Drafts at Top of Windshield; C, Spring Clamp.

the top by the clamps and to the top of the windshield by spring clamps made of sheet steel. A metal rod is run through a seam formed in the canvas filler to give weight to the device and also to afford a grip for the windshield clamps. In warm weather the filler can be easily taken off by removing the clamps.

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STRAIGHTENING BENT FRAMES.

Several methods are extensively used for straightening bent frames, but the best results can be obtained by gradually bending the metal back to shape, rather than striking it with the hammer. Apply a blow torch at the point of bend



A, Straightening a Bent Frame After Heating; B, Truing with a Wrench.

until the metal becomes red hot. Now adjust a large wrench to the end of the frame, as shown in Fig. A, and straighten by a steady pressure. If it is now found that the part is not absolutely parallel with the corresponding part, it may be trued by applying the wrench as shown in Fig. B.

ADJUSTING SAXON CLUTCH.

(C. O. M., Norfolk, Va.)

I have a 1917 Saxon roadster and have had more or less trouble with my clutch slipping. Will you tell me through the query department how to adjust it? Also please describe the oiling system on this car?

The clutch assembly as used in the four and six-cylinder models of the Saxon cars is shown in detail in the accompanying diagrams.

The Raybestos forced discs are driven from studs on the flywheel, and the steel plates are driven from studs attached to the clutch hub. When the clutch is thrown out these plates separate, the Raybestos faced plates revolve with the flywheel and the steel discs remain stationary. When the clutch is let in the clutch springs force both sets of plates together and the whole combination rotates, driving the propellor shaft, which in turn drives the transmission gearset and rear axle. The clutch is disengaged by pressing the left foot pedal.

A slipping clutch can be detected by the engine running away from the car when the throttle is opened. To adjust the clutch release the jam nut and turn the adjusting nut to the right until the spring is shortened about one-eighth of an inch. Adjust all three springs at the same time and lock the jam nuts securely. If this does not overcome the trouble the clutch should be taken out and thoroughly cleaned with gasoline.

The habit of continually slipping the clutch, instead of changing to a lower gear ratio, should be avoided, as it wears on the clutch bearing excessively. This bearing should be packed with grease every 2000 miles. The easiest way to do this is with a dope gun after the grease has been melted.

The Saxon "Four" and "Six" motors are lubricated by what is known as the constant level splash system, combined with force feed to the timing gears and forced feed spray to the main bearings. This means that a quantity of oil is carried in a reservoir. This reservoir is formed in the crank case of the motor. A pump of the plunger type draws the oil from this reservoir and forces it into the oil header, which is located just along the inside of the crank case on the right side of the engine. Oil is sprayed from this header to the crank case main bearings.

An oil pressure line leads from the pump to a pressure gauge located on the instrument board, by which the driver can determine at all times whether or not his pump is working. The oil overflows from the main bearings and returns from the timing gears, draining into the connecting rod dipper troughs, which maintain a constant level of oil just under the connecting rods. At each revolution of the motor short

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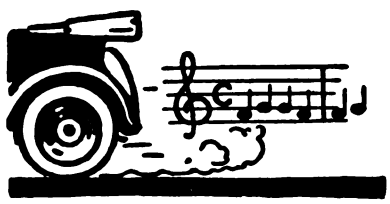
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when every place where metal rubs metal is protected by the long-wearing, unctuous, graphite veneer that is provided only by Dixon's Graphite Automobile Lubricants.

They make your car run smoother, quieter, farther per gallon of "gas" and with less upkeep.

Write for Booklet No. 210-G.

DIXON'S GRAPHITE Automobile LUBRICANTS

Made in Jersey City, N. J. by the
JOSEPH DIXON CRUCIBLE COMPANY
Established 1827

NEW DEPARTURE BALL BEARINGS



Strength
Stamina
Service



The New Departure Manufacturing Co., Bristol, Conn.
Conrad Patent Licensee

projections from the connecting rods dip into these troughs, oiling the connecting rod bearings and splashing oil over the lower ends of the pistons and over the camshaft bearings.

The proper height for the oil in the reservoir is shown by the middle or center level mark on the depth gauge or float on left side of motor.

The only attention necessary to keep the motor perfectly lubricated is to see that this depth gauge always shows that there is oil in the reservoir.

The oil in the reservoir should be drained off two or three times a season. A plug under the base will allow you to do this. Just over the plug is a screen, that should also be taken out and cleaned.

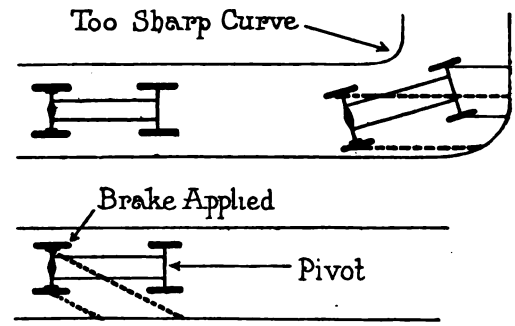
The reservoir may be washed out with gasoline by opening the petcocks on the top of cylinders and turning the engine over by hand a few times. Leave the switch key in the off position on the dash while you are doing this.

WHY CARS SKID.

Skidding generally takes place on a surface on which traction is difficult, such as a wet pavement. Usually the rear end of the car swings in a semi-circle, while the front end remains practically stationary and acts as a pivot. The speed of the car most often determines the violence of the skid, it being not unusual for a fast moving car to swing completely around, sometimes making two or more complete revolutions. If the car maintains its equilibrium, the result is nothing more than fright and strain to the parts, but if it loses its balance then it will turn turtle, and, in the majority of cases, kill or seriously injure the occupants and maybe bystanders.

While wet surfaces induce skidding, the fault can generally be traced to the driver. If he suddenly throws in the clutch while the power is applied, or if he applies the brakes suddenly and tightly, or turns a corner too sharply, then the car is more than likely to skid, with results as aforementioned.

For the effect of the clutch suddenly thrown in or out, look to the railroad engine. If the engineer applies at once all the power under his control on slippery rails, the wheels spin without gaining traction. The effect is practically the same on the automobile, except that there are no rails to keep the car steady.



Movement of Skidding Car Under Two Different Conditions.

When the brakes are applied suddenly, the effect is the reverse of the foregoing. The wheels cannot secure a purchase on the slippery road, and the momentum of the car throws it out of balance and swings the rear end around.

The effect of turning corners too sharply is different from the other two cases. In turning a corner the outside wheels must turn faster than the wheels nearest the inner curb, and, consequently, traction is reduced on the inner wheels, the result being that the car will continue to travel in a straight line. In this case all four wheels skid.

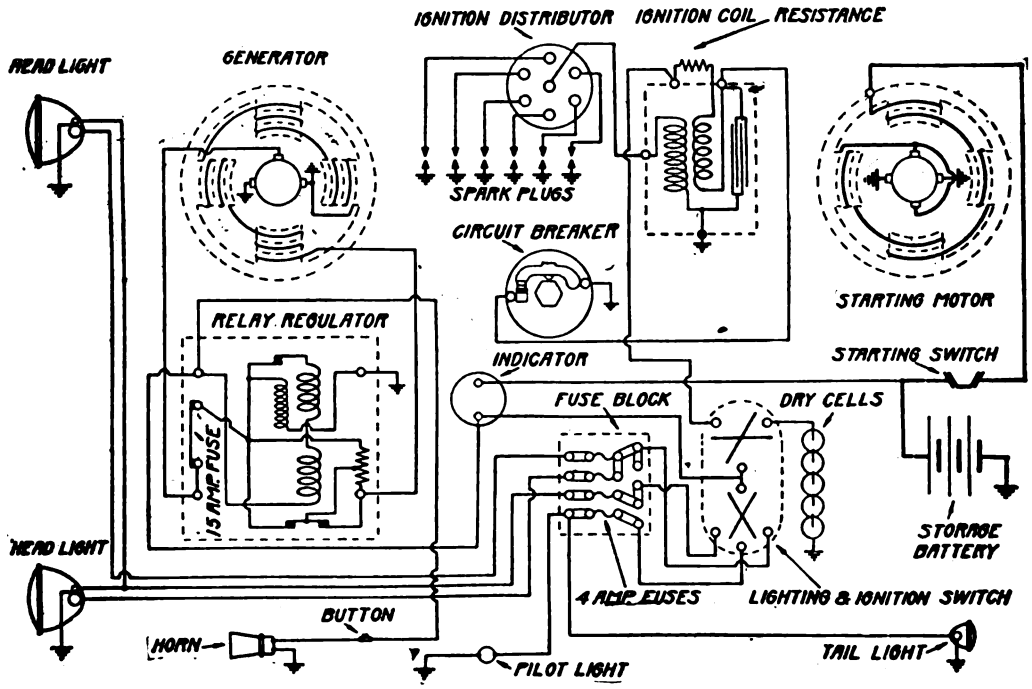
Among other causes for skidding are an unequal division of the load weight in the car body, uneven gripping of the brakes, and an unequal distribution of power. The accompanying illustrations show how the car travels during skids.

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850

Wiring Diagrams in the New Edition

Auto Electrician's Guide



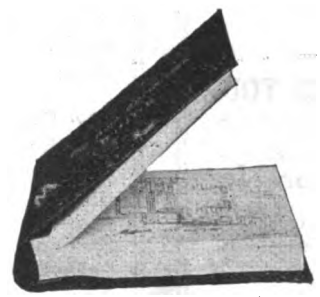
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MAKERS OF MOTOR VEHICLES
DETROIT, U.S.A.

Michigan State Auto School.
Gentlemen: —
I am in receipt of your book "The Auto Electrician's Guide," for which please accept my thanks.
We find this a very complete and valuable book and one that I have been exceedingly anxious to get hold of for some time. I not only find this book complete in every detail but simple and easily understood. It is a book every dealer or garage owner should have.
Yours truly,
H. W. Wiegand
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Dodge Bros.

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Westinghouse Electric & Manufacturing Company
SERVICE DEPARTMENT
East Liberty P. O. Station, Pittsburgh, Pa.

Michican State Auto School, Inc.,
687 Woodward Avenue,
Detroit, Mich.
(Attention A. G. Keller, President.)
Dear Sir: Referring to your letter of October 10th, with reference to "Auto Electrician's Guide," I am very glad to advise that the "Guide" has come to hand, and after a thorough inspection of same I find it to be a very valuable hand book, and congratulate you on the arrangement of it, the completeness of the diagrams and its general usefullness in the automobile trade.
If you publish any supplement or additional sheets for this "Guide" I would be very glad to receive copies of same, and if we can assist you in any way, with information pertaining to our apparatus, I would be very glad to do so.
Yours very truly,
Automobile Equipment Service Department,
W. T. Fewett, Sup't.

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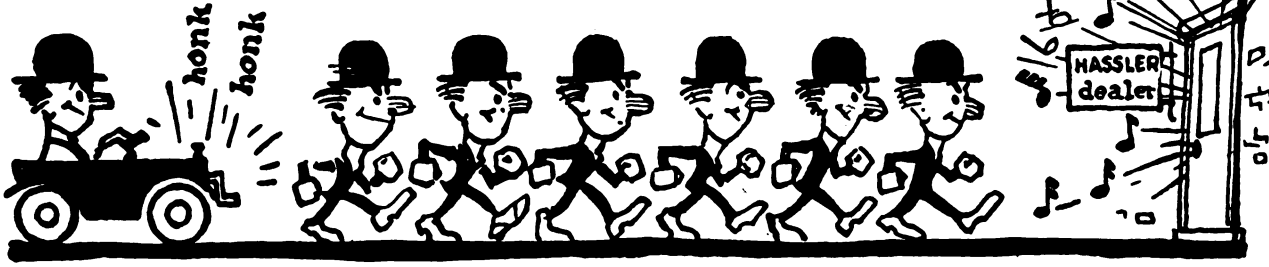
CHICAGO
1132 W. 37th Street

AUTOMOBILE JOURNAL
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—and so we let every dealer sell them—



Everybody wants to buy Hassler Shock Absorbers

—that is, when they know about them—so we decided that more dealers ought to be selling them and telling the good news. Therefore, we now let *every dealer sell Hasslers!*

Nearly a million in use—actual figures—cold cash figures—a dealer's profit in every set! That's what Hasslers have already done—and they've just started!

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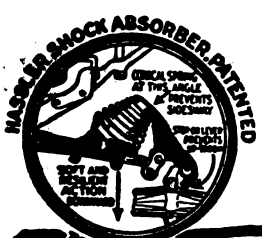
If you are in any sort of business—garage, supply, hardware, etc.—where you can offer accessories, then you can sell Hasslers—and reap some of this great harvest.

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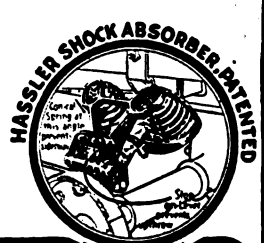
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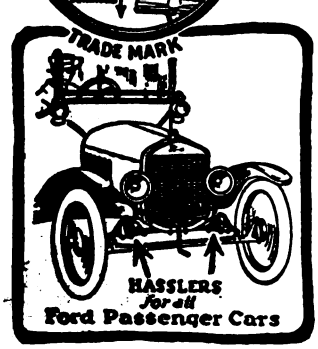
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SAVE 50%



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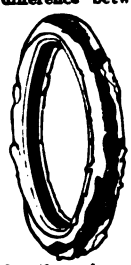
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31x3½	12.00	35x4½	18.00
32x3½	11.00	35x5	21.00
31x4	12.75	36x4½	19.00
32x4	13.00	36x5	21.50
33x4	13.75	37x5	22.00

Add 10 Per Cent. Extra for Non-Skid.

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Complete Stock of **GENUINE PARTS.**

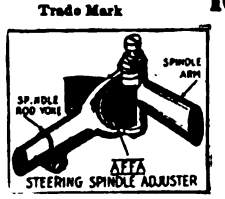
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31x4	$8.50	35x5	$13.50
32x4	$8.50	36x5	$15.00
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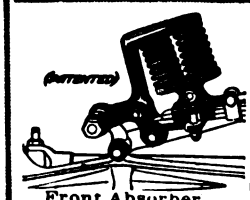
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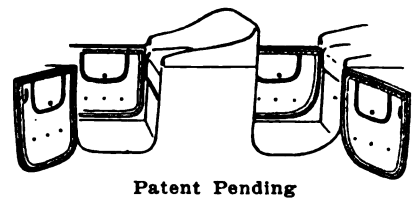
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EXPERT REPAIRING; every known Magneto and Ignition System, Starters, Motors, Generators. **Magneto Exchange and Repair Shop, 269 Halsey Street, Newark, N. J.**

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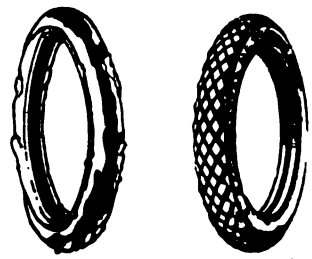
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Room, use of Bath $1.25 Room with Bath $2.00
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Add to the above rates, 50c. for each additional person.

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OUR RESTAURANT is noted for its excellent food and moderate prices.
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We use all Goodyear first quality stock and retread bands and can absolutely guarantee from 3000 to 3500 Miles.
We will replace a new tire for every one that our work does not give satisfaction.

Tires called for and delivered. We pay express charges one way on all out-of-town orders.
Price List Mailed Upon Request.

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— OF —
SLIGHTLY USED TIRES

We have a large stock of used tires and in order to make room to enlarge our retreading department we must sell this stock of tires at once. All standard makes—including
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WRITE—WIRE—OR CALL.

Size	Price	Size	Price
30x3	$3 to $4.50	34x4	$7 to $12.00
30x3½	$4 to $6.50	35x4½	$8 to $14.00
31x4	$6 to $9.00	34x4½	$8 to $14.00
32x3½	$6 to $7.50	35x5	$9 to $25.00
33x4	$7 to $9.50	33x5	$9 to $20.00
32x4	$7 to $10.00	36x4½	$8 to $14.00
33x4½	$7 to $12.00	37x5	$8 to $20.00
33x4½	$8 to $15.00	38x5½	$12 to $25.00

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We also have for immediate clearance over 500 odd size used tires. If your size tire is not listed here, write us.
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AUTO PARTS—At Your Own Prices. We can supply parts for nearly every make of car. 648 Packards, Interstate Fours, also Truck parts, GMC and other makes.
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To the Motorist:

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¶ Some oils deposit more carbon than others, but the quantity deposited amounts not so much as that which sticks in the combustion chamber and to the spark plugs.

¶ Paraffine in an oil has a tendency to form a sticky gum which collects the free carbon. The heat of the engine hardens the carbon thus collected, preventing its escape with the exhaust. Eliminate this sticky gum and less carbon is retained in the chamber.

¶ Southern oils of asphalt base contain no paraffine—there is no sticky gum generated and the free carbon being a light, soft soot may be wiped off, and is more easily blown out with the exhaust—hence, a cleaner combustion chamber is the much desired result.

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When the fighting was thickest—
When the suffering was greatest—

Where was the S. A. Lassie?

He'll say: "She was right on the job."

And now, back home—in the byways and hidden places—where misery always lives, where men, women and children are on the downgrade, she's still "right on the job."

HELP HER TO CARRY ON!

THE SALVATION ARMY

THE SALVATION ARMY HOME SERVICE FUND
MAY 19 TO 26

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THE AUTOMOBILE JOURNAL

VOL. LXVI. PAWTUCKET, R. I., MAY, 1919. NO. 10.

Ready for Sweepstakes at Indianapolis

Big Race Likely to Reveal New Developments in Automobile Mechanism

THE big 500-mile automobile race scheduled for Indianapolis, May 31, will, according to all indications, be the big event in the racing world this season. With no race since 1915, the sweepstakes will signalize not only the resumption of racing, but also the return of the motor car industry to a practically normal basis.

Wholly aside from its interest as a sporting event and as a speed spectacle, the race is being looked forward to as likely to reveal some quite new developments in automobile principles. Race courses have always been the proving grounds of innovations in motor car construction, and to speed contests, more than anything else, is attributed the rapid perfection of automobile mechanism.

Only 33 out of the 43 nominated for the sweepstakes will be permitted to start in the contest, owing to an American Automobile Association rule that limits the number of cars in any speedway race to one for every 400 feet of track.

Among the cars that have been nominated there are many that the average motorist will not recognize by name and there are some that depart so radically in construction from accepted stock car standards that they would be considered freaks were it not for the fact that they are backed by some of the leading motor engineering concerns of the world.

FACTS REGARDING RACE.

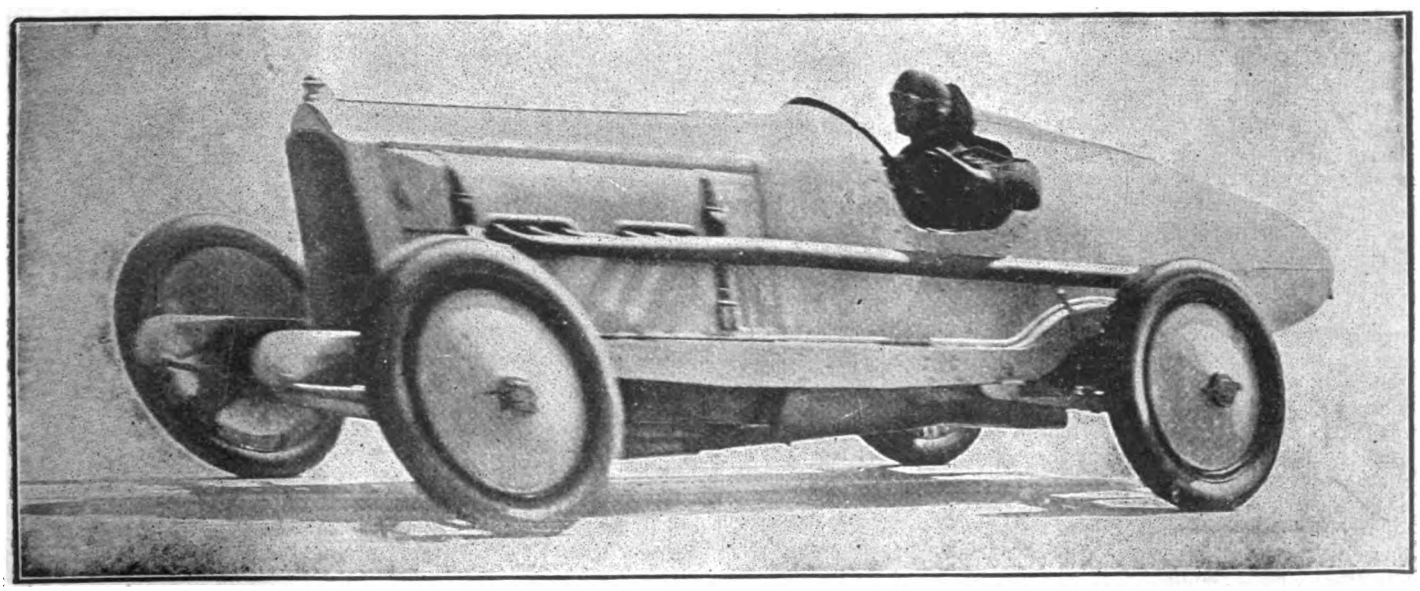
Total prize money.....$50,000
Prize for winner.....$20,000
Prize for second.....$10,000
Prize for third..... $5,000
Remainder to be divided among those who finish from 4th to 10th.
Referee.....Eddie Rickenbacher
Starter.....E. C. Patterson
Pacemaker.....Jesse G. Vincent

They give the first insight into what post-war developments are likely to be. The interest of the foreign builders in this race also indicates that they are looking toward America with the purpose of reviving the formerly profitable market for the European built motor cars.

Three of the Big Four among the nations of the Allies are represented: Italy through Dario Resta, France through Goux, Guyot and Thomas, and England through the aluminum-bodied Sunbeam fliers. With the arrival of the English Sunbeam cars that Jean Chassagne and Resta will pilot, it developed that these machines incorporated new principles of design. The cars are fitted with six-cylinder, ball bearing crankshaft engines, with 80x150 mm. bore and stroke, and develop 152 horsepower at their normal crankshaft speed of 3000 revolution per minute. They are equipped with four speed transmissions and have a wheelbase of only 108 inches, to accommodate themselves to the short radius of the Indianapolis turns.

French Entries.

The French entries, notably the four Ballot cars to be driven by Thomas, Guyot, Bablot and Wagner, also have unusual features. The engines have eight cylinders, but instead of being arranged



Ralph De Palma, American Favorite, in Racing Car.

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ENTRIES FOR INDIANAPOLIS SWEEP STAKES.

	Driver	Car		Driver	Car
1.	Cliff Durant	Chevrolet Special	23.	Arthur Thurman	Thurman Special
2.	Ralph Mulford	Frontenac	24.	Wilbur D'Alene	Duesenberg
3.	Jean Chassagne	Sunbeam	25.	E. L. Shannon	Mesaba Special
4.	Dario Resta	Sunbeam	26.	Tom Alley	Bender Special
5.	W. W. Brown	Richards Special	27.	Roscoe Sarles	Oldfield Special
6.	Jules Goux	Peugeot	28.	Arthur Klein	Peugeot
7.	Louis Chevrolet	Frontenac	29.	Andre Boillot	Baby Peugeot
8.	Gaston Chevrolet	Frontenac	30.	Not named	Peugeot
9.	Joseph Boyer, Jr.	Frontenac	31.	Rene Thomas	Ballot
10.	Earl Cooper	Stutz	32.	Albert Guyot	Ballot
11.	Tom Milton	Duesenberg	33.	Jules Bablot	Ballot
12.	Eddie O'Donnell	Duesenberg	34.	Louis Wagner	Ballot
13.	Dave Lewis	Duesenberg	35.	A. E. Cotey	Ogren Special
14.	Kurt Hitke	Roamer	36.	J. J. McCoy	McCoy Special
15.	Eddie Hearne	Durant Special	37.	Omar Toft	Darco Special
16.	Louis LeCocq	Roamer	38.	P. W. Monahan	Jay-Bee Special
17.	Ralph DePalma	Packard	39.	Not named	Detroit Special
18.	Eddie Pullen	Hudson Special	40.	Not named	Premier
19.	H. C. Simmons	Hudson Special	41.	Not named	Premier
20.	Ira Vail	Hudson Special	42.	Ray Howard	Peugeot
21.	Denny Hickey	Hudson Special	43.	J. M. Reynolds	Hudson Special
22.	Not named	Hudson Special			

V shape, which is the common practise with multi-cylinder motor car and aviation engines, the cylinders are all in line. They have a normal racing speed of 3500 revolutions per minute. There are five other French cars in the race, all Peugeots, but aside from minor improvements, they do not offer any radical changes.

Among the American entries there is great interest in the Packard, with a 12-cylinder aviation engine that has been entered by the Packard Co., which this year for the first time is taking part in speedway racing. Ralph DePalma will be the driver. He won the Indianapolis race in 1915.

The Hudson is strongly represented, with six special cars and with such drivers as Eddie Pullen and Ira Vail among the pilots. The Duesenberg racers, of which there are four, present novelties of design, particularly in regard to valve arrangement. The drivers include O'Donnell, Milton, Lewis and D'Alene. Another large team is the Frontenac, with Louis and Gaston Chevrolet, Joseph Boyer and Ralph Mulford as pilots.

Clifford Durant has a Chevrolet Special and Eddie Hearne a Durant Special. Earl Cooper will drive a Stutz. Roscoe Sarles has Barney Oldfield's old racing car. There are also two Roamers, two Premiers and a number of other special cars.

Rickenbacher Referee.

Capt. Eddie Rickenbacher will act as referee. E. C. Patterson, Chicago, holder of the cross-country motor car record between New York and Chicago, will be the starter, and will be assisted by W. S. Gilbreath, manager of the Detroit Automobile Club.

Lieut. Col. Jesse G. Vincent, vice president of the Packard company, will set the pace in the flying start and will drive a Packard Twin Six runabout that has been built especially for this event. It has a standard chassis with 125-inch wheelbase, but is equipped with a special gear ratio and steering gear.

The total prize money is $50,000, of which $20,000 goes to the winner, $10,000 to second, $5000 to third and the remainder to those who finish from fourth to 10th.

Time Trials.

Time trials will be held at the Indianapolis speedway beginning May 27 to determine the final field that will face the barrier for the big Hoosier classic. Each contestant will be given three opportunities to show his speed, in a single circuit of the 2½-mile track, and the fastest 33 will survive, the best lap out of the three counting the final standing. No entrant who cannot show a speed better than 80 miles an hour will be permitted to start, however, whether he survives under the above conditions or not.

Starting positions for the contest will be awarded in the order of the speed shown by contestants in their time trials, the fastest car starting in first position, next the pole, and the rest following in order.

Ralph De Palma, at the wheel of his 12-cylinder Packard, rules as the probable American favorite for the coveted No. 1 position. His mount is probably the fastest American car in the race, and in a short sprint it is considered almost unbeatable. Whether the 12-cylinder construction will as successfully survive the test of the long 500-mile grind is another question, which only the day of the race can answer. However, as the speed favorite, De Palma rules as America's first choice.

Europeans in Race.

Among the Europeans, it is thought probable that the Ballot team, composed of Thomas, Guyot, Bablot and Wagner, stands the best chance of emerging from the conflict of the speed trials with first honors. The Ballot cars are new creations, built especially for the Indianapolis 500-mile event, and are said to be the fastest thing on wheels that Europe has yet produced.

Also it will be well to keep an eye on Resta and Chassagne, the gasoline steeds of this combination having been credited with a speed of 122 mils an hour by no less an authority than Capt. Eddie Rickenbacher, American "Ace of Aces," who drove them in a series of tests on the Brooklands track in England before entering the American aviation service in France.

Other likely incumbents of first position are Goux, at the wheel of a Peugeot; Chevrolet, in a Frontenac, and Cooper, at the wheel of a Stutz. Any one of this trio is capable of circling the Indianapolis track in record time and may choose to let himself out to the limit in the time trials.

Some Unfortunate.

Turning to the other side of the picture, after the time trials have been run there will remain 10 unfortunates who, after weeks and months of strenuous preparation for the greatest of all racing classics, will see their hopes to rank among the elite of the racing world ground in the dust without the satisfaction of even having faced the starter, or gone roaring around the track in the thrilling first round that is the inaugural of all Indianapolis 500-mile events.

To these cars will be denied the blaze and glory of actual competition of threading their cars through a maze of wheeled torpedos moving with bullet-like speed, of pitting their skill and daring against the best the world has to offer. Three meager laps of the track under the cold, impartial eye of the starter, and a soulless electric timing apparatus to record their failure, and their brief day of glory will be over.

However, the world of sport has little compassion for him who goes down to defeat, unless it be an heroic catastrophe like that which befell Ralph De Palma at Indianapolis, in 1912, when, with but one lap more to go and victory within his grasp, his Mercedes faltered and the hard won fruits of victory vanished in the twinkling of an eye. Ordinarily the failures depart from the arena unhonored and unsung, save for their own regrets.

Ralph De Palma.

Ralph De Palma believes in the superstition of the race track. In entering the sweepstakes he has named the only mechanician that ever brought him a victory on the Hoosier oval. This is Louis Fontaine, a diminutive Frenchman, from Milwaukee, who rode with him in 1915 when he copped first place in the $50,000 race with the Mercedes. De Palma did not file his entry until he had signed Fontaine and put the Frenchman to work rebuilding the 12-cylindered Packard that boasts a string of speed records as long as the tail of a kite.

With a car that has proved its worth and a mechanician who has brought him wealth and victory at Indianapolis, De Palma is confident that his old Jinx will be handled a solar plexus from which it will not recover until after the race is run.

Dario-Resta.

Dario Resta, owner of the only championship medal in the history of American automobile racing, will defend his right to the title won in 1916. Resta is a driver who is possessed of great mechan-

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ical ability and is also a shrewd driver. It is noticeable that he either wins or does not finish the race.

In the 15 races that figured in the 1916 championship Resta finished first in five and gained 4100 points. While he did not start in all of the 15 title events he never took the checkered flag after it had been waved for an opponent.

Andre Boillot.

Andre Boillot, brother of the Boillot who raced in Indianapolis in 1914, has come to this country with two of his pet speed creations—a "baby" Peugeot and a French "Spad" plane. Boillot entered his Peugeot in the Liberty sweepstakes immediately after he was discharged from the service. His brother, George, who was killed in action as an aviator, had been anxious to win the greatest of American races ever since an accident cost him the victory in 1914, as he was a Grand Prix winner. Andre believes that he has the car to make the name of Boillot famous on two continents.

Jean Chassagne.

Jean Chassagne, who holds the world's hour record for driving an automobile, will be making his second bow in America when he lines up to get his bit of the $50,000 prize. Chassagne made his first appearance with a Sunbeam in the 1914 race at Indianapolis, but an accident put him out of the 500-mile dash after he had reeled off 60 miles.

He is a Frenchman and has been discharged by the French army after serving at the English Sunbeam plant, as its representative, in the purchase of aviation engines during the war. Originally he was to team with Joseph Christiaens as the driver of one of the new Sunbeams that Louis Coatelen has built in the hope of gaining for England the coveted honor of an Indianapolis victory. Now he will team up with Dario Resta.

Louis Chevrolet.

Louis Chevrolet has the distinction of being one of the few drivers to win a big race on "three legs" or three cylinders. Chevrolet is noted for driving a car to get every ounce of speed out of it, and if his new creation lives up to his expectations all the drivers will know he is out for the lion's share of the $50,000 purse before the checkered flag is waved on the winner.

Clifford Durant.

Clifford Durant is the only millionaire race driver who has been a consistent supporter of the sport in recent years. Durant, who is champion of the Pacific coast, has been praying for a revival of the Indianapolis 500-mile races ever since the armistice was signed. When the race was announced he did not waste time and was the first to make an entry to the sweepstakes.

Jules Goux.

Jules Goux will drive a Peugeot, famous on two continents. The car that Goux will face the starter with is the same that Georges Boillot drove in the last French Grand Prix in 1914 and with which he gave the German Lautenschlager the battle of his life on the tortuous course near Amiens, France. In France, Boillot, who fell in the second year of the war, was an idol, for he had been unusually successful with the Peugeot.

Kurt Hitke.

Although Kurt Hitke, who has been nominated to drive the Roamer-Duesenberg in the 500-mile Liberty sweepstakes, is starting in his first major league race as a driver, he is not a novice. Before he came to this country he was a successful rider in bicycle and motorcycle races in Europe. During 1916 while a member of the Duesenberg team Hitke rode as mechanic to Ralph Mulford and the "wild man from the West" Wilbur D'Alene. He also sat beside Earl De Vore for a part of that year's races. In 1917 he was Pete Henderson's mechanic until the Canadian speed merchant entered the aviation service. Last season he rode with Tommy Milton, the St. Paul lad, who is billed to drive Fred Duesenberg's new eight-cylindered racer in the Liberty sweepstakes.

Eddie O'Donnell.

Eddie O'Donnell was the star of the Duesenberg team three and four seasons back. O'Donnell has been out of the game since the race on Kansas City's dirt speedway in the summer of 1916. Two races were put on that day on the makeshift speedway and after the first 100-mile event had been run off the track was deeply furrowed. In the second race over the 25-mile route O'Donnell went out to clean up. He was in the lead when he crashed through the fence and came out with bruises and a broken arm. The arm was set but the bone would not knit and after having it rebroken three times O'Donnell has finally succeeded in getting the "wing" in shape to hold a car traveling more than 100 miles an hour.

Earl Cooper.

Six seasons ago, in 1913, Earl Cooper swept across the speed horizon and gained the title of road race champion of 1913, by winning five out of six highway events in which he started. He used a Stutz car to turn the trick and in entering the sweepstakes will again use the only make of car he has ever driven when he battles for the $50,000 purse. When Cooper showed up in 1913 to act as relief driver, he had a peculiar experience. Cooper drifted out to the speedway and, showing his credentials, started for the garages to look up Harry Stutz and the team. No one would pick out the Californian for a race driver as his appearance stamped him as one of the clergy.

W. W. Brown.

W. W. Brown, will fly the colors of Kansas City. "Brownie" will have a multiplicity of valves for while the other boys can speak of their 16 inlets and outlets for the engine, the boy from the banks of the Kaw will have 24, having added two valves to each cylinder of the Hudson super-six he will drive to give it the necessary speed that he thinks is needed to cut in for his share of the $50,000 prize. Brown is not a new comer having driven the Du Chesneau in 1915 on the speedways, making a good showing.

Ralph Mulford.

Natural aptitude to understand an internal combustion engine made a star racing driver of Ralph Mulford, who will drive a Frontenac. Mulford comes from a little town near Portland, Me. From his earliest days he was fascinated by engines. Mulford started driving for the Lozier factory when he was located in Plattsburg, N. Y.

Tommy Milton.

Tommy Milton, a product of the dirt tracks, has been flirting with fame and fortune on the speedways for two seasons. Milton is going to drive a Duesenberg entry, having been nominated by Fred Duesenberg. In all his previous races Milton has driven a four-cylinder engined car. This time he will have an eight, the latest speed creation turned out by the Duesenberg Brothers, Elizabeth, N. J.

Eddie Hearne.

Eddie Hearne, the lone survivor of the millionaire drivers of a decade ago, has been nominated by Cliff Durant to drive the second Chevrolet Special, which took second place in the recent Santa Monica road race of 250 miles. That Hearne can make the Chevrolet do tricks was shown in the first race in which he took the Chevrolet No. 2, and went through the race without a stop. Durant had the faster car and nosed Hearne out, despite a loss of 52 seconds at the pits in two stops. The car was new to Hearne at the time and since the Santa Monica race he has overhauled the racer and claims to have put about five miles an hour more under the bonnet and to be in a position to give his "boss" the battle of his career.

Eddie Pullen.

Eddie Pullen, who holds the American and world's road race record of 87.8 miles an hour, established in the Corona, Cal., race in 1914, will be relief driver for Durant. Pullen is also the only American driver to ever win the American Grand Prize road race, achieving that prominence in the 1914 event at Santa Monica.

Tragically Absent.

There will be some familiar faces tragically absent, notably George Boillot, the automobile idol of France, who in 1914 raced as a teammate with Jules Goux. Boillot died for France when he was shot through the heart by a Hun machine gun bullet while fighting 10,000 feet in the air. Josef Christiaens, a favorite of Albert, King of the Belgians, who twice raced in America, a veteran of many thrilling races, was killed at Wolverhampton when testing out a car for the Liberty sweepstakes. Many will miss the smiling countenance of the well liked and famous John Aitken.

Speedway History.

Speedway racing was first introduced in America in 1909 by the promotion of the Indianapolis motor speedway. The idea originated in the fertile brain of Carl G. Fisher, who enlisted as his associates in the venture J. A. Allison, A. C. Newby and F. H. Wheeler, all of Indianapolis.

The original track was completed in August of 1909 and the first racing events were held on Aug. 19, 20 and 21. The track was of taroid construction and

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failed to stand the wear of speeding race cars. Due to the tremendous speed great ruts were worn at the turns, which caused many disastrous accidents. The investment of the speedway up to that time had been approximately $500,000. Immediately after the first races the owners decided to pave the track with brick and work was started at once and was completed early in 1910 at an additional cost of approximately $150,000. Since that time many improvements have been added to this great speed course. Among these are safety aprons for the turns, retaining walls, additional grandstands, tunnels and better inside roads.

First 500-Mile Race.

During the year 1910, racing activities were confined to short races, which were held during the months of May, July and September. Following closely the races in September, 1910, came the announcement that startled the automobile racing world—a 500-mile race for a cash purse of $25,000, a sum unheard of or even dreamed of to be offered for an automobile racing contest. Prior to that time the most famous race course was the Brooklands track, in England.

Since that time numerous race courses have been built in America, notably the Sheepshead Bay track at New York, the Cincinnati speedway and the Uniontown (Pa.) speedway. In addition to these, specially constructed tracks have been built at Atlanta, Los Angeles, Omaha, Des Moines, Minneapolis and Chicago, but for various reasons have been abandoned.

The Indianapolis track, the parent speedway of America, has probably paid out in purses as much as the combined purses of all other American speedways, to which might also be added the purses paid out in connection with all American automobile road races. In 1912, 1913, 1914 and 1915 the purses were for $50,000. The classic was cut to 300 miles in 1916 and the purse to $30,000.

Concretely, the Indianapolis motor speedway will have awarded, when this year's purse of $50,000, to be contested for on May 31, is included, $335,490 in purses. A conservative estimate of the numbers who have attended speedway races places the figure at about 500,000.

The Indianapolis speedway has been a huge success ever since its inception. Other speedways have arisen at tremendous expenses and after a failure or two have sunk.

MOTORDOM'S FIRST BIG INTERCITY MATCH

The New York Athletic Club will meet the Chicago Athletic Association and the Chicago Automobile Club in a three-cornered automobile reliability team match on June 12 and 13. It will be a two-day contest, with the start and finish at Travers Island, while the night stop on the road on the night of the 12th probably will be at Lenox, Mass.

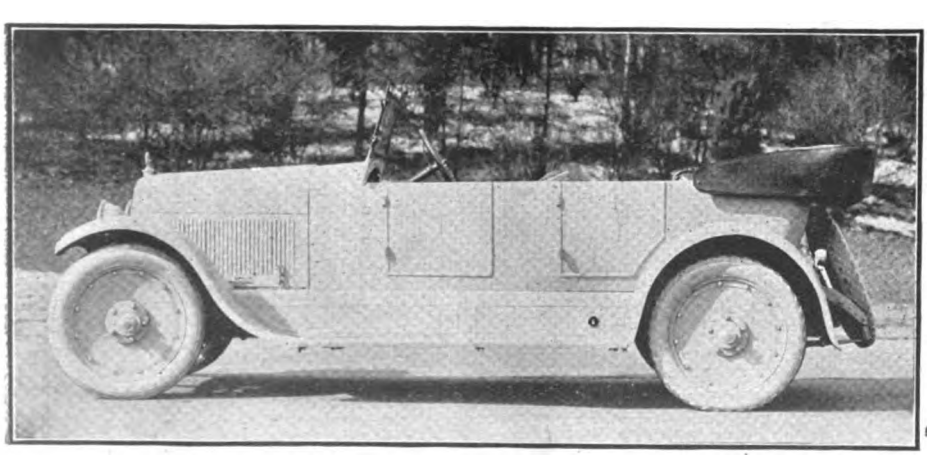
This will be the first intercity automobile team match of any consequence that the motoring world ever has known. The Chicagoans will drive over the road to New York. It is expected the westerners will enter at least 20 cars.

The match will be for the Rickenbacher trophy which has been hung up by Major E. V. Rickenbacher, America's ace of aces, and in all probability the donor of the trophy will act as referee, while Fred J. Wagner will be starter.

The arranging of this match is due to the energetic action of William C. Poertner, the newly appointed chairman of the Automobile Committee of the New York Athletic Club, who is arranging all the details of the match. He has appointed W. Irving Fickling captain of the team and the latter already is recruiting his aggregation of motoring talent for the dash with the westerners.

He has plenty of available timber, for among the well known local drivers who are eligible through holding membership in the N. Y. A. C. are C. H. Larson, T. B. Van Alstyne, W. Parkinson, W. A. Allen, R. M. Owen, Ralph Owen, L. A. Van Patten, Frank Roche, G. F. Ballou, A. J. Picard, Robert Wolfers, David Beecroft, E. McShayne, James Nichols, Harry Haupt, R. H. Johnston, W. L. Colt, I. M. Uppercu and Joseph Brandenburg.

The two Chicago teams already have been organized and the entries include E. C. Patterson, S. E. Hibben, J. W. Maguire, A. N. Eastman, B. B. Ayers, F. W. Wentworth, L. T. Jaques, Clifford Ireland, N. H. Van Sicklen, H. P. Branstetter, Charles E. Gregory, F. A. Hill, H. W. Mersbach, J. E. Callender and J. T. Brown.



The Jordan Silhouette—The Jordan Motor Car Co. Announces That This Car Has Met with Instant Demand. The Silhouette Has a Solid Aluminum Body, and Is Long, Low and Graceful. It Has the Newest French Angle at the Dash, a Cocky Seat Cowl and Fenders Broad and Full Crowned.

SHEEPSHEAD BAY SPEEDWAY TO OPEN NEXT MONTH.

The fight for world's supremacy in speedway racing this season will be the greatest in the history of this thrilling sport. The ending of the war has released all the speed demons of France and Italy and by the time that the Sheepshead Bay Speedway opens for the first classic in the East, June 14, every foreign rider of note will be in this country contesting the right of Ralph De Palma to claim the world's championship.

The first meet is scheduled for Uniontown (Pa.) Speedway, on May 17. This will be a tuning up race for many of the drivers who will start in the 500-mile event in Indianapolis on Decoration Day.

Then will come a sweepstakes at Sheepshead Bay on Saturday, June 14.

U. S. TO GIVE 20,000 MOTOR TRUCKS TO STATES.

Joys dispelled glooms among the automobile industry and trade when Washington announced that more than $45,000,000 worth of motor trucks were about to be distributed by the secretary of agriculture through the Bureau of Public Roads to the State Highway Departments. This news killed all rumors that Uncle Sam might flood the market with trucks bought for war purposes.

These trucks have been declared surplus by the War Department and are being distributed to the states under the provisions of section seven of the post-office appropriation bill. They must be used by the states on roads constructed in whole or in part by Federal aid, for which $200,000,000 in addition to the former appropriation was given to the states under the same bill. All that the states must do to acquire the use of these 20,000 trucks, which range in capacity from two to five tons, is to pay the loading and freight charges.

Of the 20,000 motor vehicles to be acquired practically free by the states, 11,000 are new and 9000 are used, but all are declared to be in serviceable condition. The motors will be apportioned to states only upon request of the state highway departments on the basis of the requests received from the respective states and in accordance with the apportionment provided in the Federal aid law approved in 1916. The requirements of the law are such that the bureau of public roads cannot distribute any trucks to counties or individuals.

TIRE PRICES REDUCED.

The expected reduction in tire prices came May 12, when Goodyear announced a cut of approximately 15 per cent. United States Tire, Firestone and other companies followed suit, the average reductions being 15 per cent.

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Urge Autoists to Aid Plan to Abolish Bridge Tolls

The Automobile Journal has received the following letter from James McKibben, secretary of the Boston Chamber of Commerce:

"I received under date of May 6 a letter from E. L. McColgin, managing secretary of the Troy Chamber of Commerce, Troy, N. Y.—a letter in which he calls my attention to the fact that on Tuesday, May 13, the governor of the State of New York will hold in the executive chamber in Albany at 2 p. m., a public hearing on the question of abolishing payment of bridge tolls on the highways of New York state.

"Three bills are now before the New York Legislature covering this point. These bills are as follows: Troy-Watervelt Congress street bridge, No. 780, by Mr. Mackrell; Albany-Greenbush bridge, No. 1112, by Mr. Malone; Schenectady-Scotia bridge, No. 1335, by Mr. Yelverton.

"The interest of New England in these bills need not be dwelt on with anyone who is familiar with the conditions prevailing in the operation of automobiles, either for pleasure or business purposes, out of New England into New York territory. As the situation now stands everyone going over these bridges either into or out of New England must pay tolls at Troy, Albany and Schenectady. These bridges are of equal importance since people from the southern part of Massachusetts will use the Albany-Greenbush bridge, those using the northern roads to and from the West will use the Troy bridge and all of them must use the Schenectady-Scotia bridge.

"In view of the increased volume of commercial business moving between Massachusetts and New York state, as well as the movement of tourist business out of New England either by way of Pittsfield or North Adams, it appears that commercial interests as well as automobile interests in Massachusetts, even as far away from the Hudson river as Boston itself, have a vital interest in the removal of these tolls. This interest is apparently destined to become greater year by year.

"For these reasons it is evident that if anything can be done at this time to insure the abolition of these tolls it will not only mean a great convenience and saving to New England automobile traffic using these bridges, but it probably will save much greater effort at some time in the future when the abolition of these tolls will represent a more serious curtailment of revenue.

"May I ask you to look into this matter as soon as possible and take such action in connection with it as will further to best advantage the interests of your organization. Specifically, what Mr. McColgin suggests in this direction is the sending immediately of a memorandum or resolution to Governor Whitman at the executive chamber in the capitol at Albany referring to the bills mentioned above and indicating the interest of your organization in the passage of these bills."

REGISTRATION RECORDS FOR BAY STATE ARE BROKEN.

Records of the automobile registration department of the Massachusetts Highway Commission continue to be broken, as day after day the number of cars and trucks registered increases. Thus in the four months to May 1st new records were established for the registration of both cars and commercial vehicles. Up to the first of this month the department had given out 128,500 sets of number plates for passenger cars and 31,825 sets of plates for commercial vehicles. To show what an increase this is Commissioner James W. Synan has prepared a comparison with last year and the year before.

During the first four months of last year the registrations of passenger cars were 113,231 and of trucks 26,052. Perhaps more significant of the growth of the use of motor vehicles in Massachusetts is the comparison with two years ago. This shows that in the first four months of 1919 more cars and more trucks were registered than in the whole of 1917. The figures for the entire year of 1917 were 128,068 passenger cars and 20,964 commercial vehicles. For the whole of 1918 the registrations of passenger cars were 143,189 and of commercial vehicles 33,011. These totals will undoubtedly be surpassed in the first half of this year, if registrations are maintained at the present rate.

The motorists paid the state up to May 1st of this year in fees for registration certificates and licenses a total of $1,759,485. This is about $250,000 more than they paid in during the corresponding months last year.

FORM MUTUAL ASSOCIATION.

The Mutual Automobilists' Cooperative Association, Inc., to furnish attorney services to owners of automobiles, etc., has been chartered in Delaware with $5000 capitalization by Wray C. Arnold, M. Elliott and Frank J. Riera, all of Philadelphia.

Examination for Owners of Cars in New York

Under a new law all operators of motor vehicles within Greater New York must pass an examination as to their fitness to drive and pay a fee of $2 for a driver's certificate. The law, which has been signed by Gov. Smith, becomes of force in August. It affects about 90,000 motor vehicle operators who wish to drive within the city limits for more than 10 days during the year beginning Aug. 1.

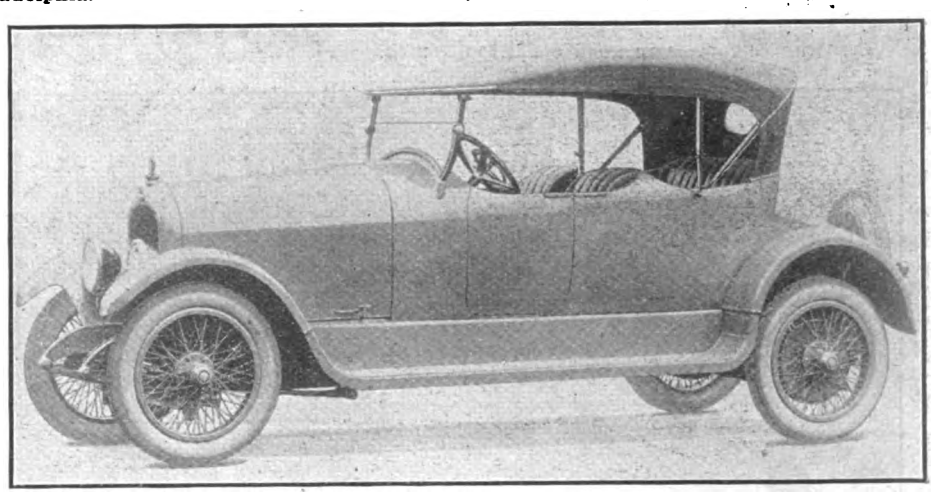
There would not be sufficient time, of course, for the office of the secretary of state to examine 100,000 or more applicants before that date, and doubtless there will be some compromise regarding persons who have been operating automobiles without accident or without arrest for several years. Drivers who have bad records in the traffic or other courts and beginners may be compelled to appear in person before the official examiners and demonstrate their ability and fitness.

The driver residing outside of the city who comes within the city more than 10 times during a year, it is thought, will receive the same consideration this year as experienced drivers residing within the city—that is, if they have been visiting the city and driving within it for several years they will be given certificates without passing actual driving examination.

COMMITTES FOR 1920 SHOWS NAMED BY CLIFTON.

President Charles Clifton of the National Automobile Chamber of Commerce has appointed the following as a show committee for the 1920 passenger car section: John N. Willys (Willys-Overland), chairman; H. G. Root (Westcott), and H. M. Jewett (Paige).

The committee on motor truck shows consists of M. L. Pulcher (Federal), chairman; A. J. Whipple (Diamond T) and David S. Ludlum.



Marmon 34 Four-Passenger Roadster. The Popular Four-Passenger Roadster of the New Series Has Been Enlarged, Being Wider Front and Rear, with Higher Sides. The Windshield Is Lower and Slanting. The Top Is Also Lower Than on the Touring Cars.

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PLAN BIG CAMPAIGN AGAINST MOTOR CAR THIEF

THE National Automobile Chamber of Commerce, the Society of Automotive Engineers and the Insurance Laboratories have united in an effort to deal with the motor car thief. There are upward of 100,000 automobiles stolen in this country in the course of a year.

Rapidly as the number of cars has increased during the last four years, the number of thefts has increased still more rapidly, showing that this "industry" is growing by leaps and bounds. In fact, it is not too much to say that the car stealing problem has reached a condition of crisis.

Something has got to be done to deal with it in a broader way than has ever been attempted. As a matter of fact the insurance companies are threatening a material increase in premiums if the condition is allowed to continue. Now it happens that the individual car owner can do something toward solving the problem, though he cannot do everything that must be done to eliminate stealing of cars.

Two Classes of Car Thieves.

Car thefts may be divided into two distinct classes, in one of which is placed the work of the professional automobile thief, while in the other is the activity of the so-called "joy rider," the boy or man who seizes an unguarded car to use for his own pleasure or convenience.

Against the professional thief there is no locking device available that will prevent his getting a car on which he has set his mind. There are a number of locks of different types, however, which will foil the joy rider, and this is the part of the problem that the individual car owner can solve.

As a result of the investigations of the National Automobile Chamber of Commerce, the Society of Automotive Engineers and the Insurance Laboratories, the conclusion has been reached that four types of locking devices meet the need of the situation.

Types of Locks.

The first type mentioned is the transmission lock, which locks the gearshift in a set position, making it impossible to operate mechanism until this has been released. This type of lock is not applicable to the Ford and to certain other makes.

The second type is the steering system lock. This type is applied to the steering wheel or steering column. In some cases it operates to release the steering wheel, so that it swings around free from the column, making it impossible to steer the car. In other cases the wheels are locked in one position so that the car cannot be guided out of the straight path.

Other types of locks operate on the fuel and ignition systems. These locks shut off the gasoline or switch off the ignition as the case may be.

When the owner equips his car with a locking device he should make sure from his insurance company that the particular make of locks he buys has been approved by the underwriters. A mistake here may cost the motorist $15 a year.

Delays Professional.

One of the efficient locking devices will delay even the professional, although it may not deter him from stealing a car if he is determined to take it. However, even the delay justifies the use of the lock. The professional thief is usually a graduate of one of the automobile factories or a big repair shop, and he has probably been a chauffeur. He has practically spent his life around cars and, knowing every nut and bolt of the mechanism, can get around every trap, regardless of its cunning.

In order to thwart the professional thief it is proposed to put the car on the same plane with real estate. When a car issues from the factory, its purchaser receives a deed of ownership, which will be registered just as a realty deed is registered. This deed stays with the car throughout its life, and the vehicle cannot be sold without the deed being duly executed to the new buyer. Under these circumstances it would do the professional thief no good to steel a car, because he would not be able to offer a clear title with it.

SUGGESTIONS FOR RENOVATING USED CARS

The car that has seen one or two years service is bound to be somewhat marred and shabby in appearance. While the owner may not be in a position to buy a new car this year, yet his pride in keeping up appearances demands a spic and span appearance.

The expert auto and carriage painter can obtain the real "factory finish," but there are many of us who cannot spare the amount necessary for this work, so it's well to know how to do the work. It's not a difficult job when one knows how.

When the surface is in good condition and it is desired merely to freshen up the colors, clean off all dust, dirt and grease with benzine or turpentine. Sandpaper lightly to cut the gloss and then apply one or two coats of a good auto finishing varnish.

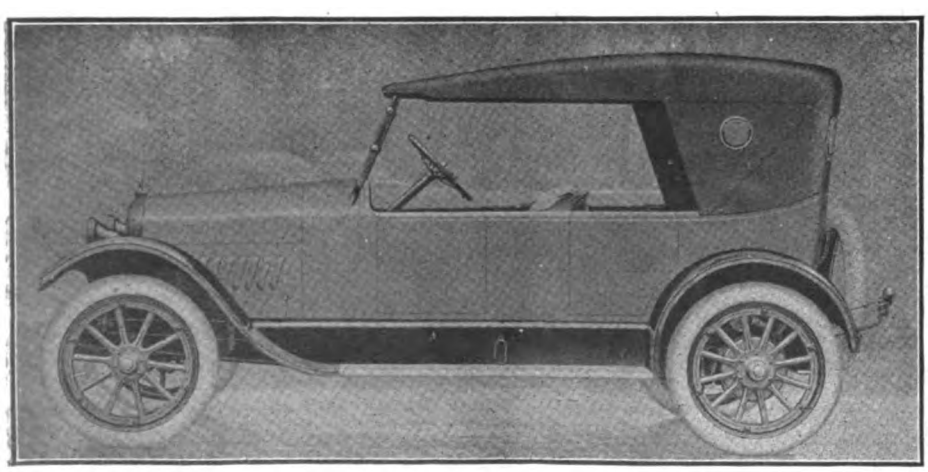
If it is desired merely to change the color in keeping with your own ideas, first thoroughly clean off all foreign matter with sandpaper as directed above. Then apply two coats of auto enamel of the desired color. Where an exceptionally high finish is desired, complete the finish with one coat of auto finishing varnish.

When the surface is in bad condition and paint has chipped or cracked, remove all loose particles and prime such spots with lead and oil primer, composed of lead in oil thinned with turpentine and a little Japan drier. Allow to dry 12 hours. Deep cracks and dents should be filled with filler and surfacer, knifed on as you would use putty. Allow to dry eight hours and sandpaper level. To thoroughly even up the surface, apply one or two brush coats of the filler and surfacer, eight hours apart, sandpapering each coat with fine sandpaper.

Next apply one or two coats of good auto enamel of the desired color, using the color recommended by the dealer as the proper ground coat for the color of enamel selected. Sandpaper lightly between coats.

Then apply one or two coats of good auto enamel. This will complete the job. If, however, an exceptionally high finish is desired, complete the work by applying a final coat of auto finishing varnish.

These various treatments, under proper conditions, will give your car a factory newness. In appearance you will have a new car quickly and cheaply.



Elgin Six Military Scout. One of Latest Models Makes Strong Appeal to Motorists.

When changing carburetor adjustments do not attempt to hurry the work. Give at least 15 seconds between changes to allow the engine to respond to the change. There is usually some gasoline in the inlet manifold which has not vaporized. By waiting between adjustments this will be more fully dissipated and better results can be obtained.

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SPACKE ROADSTER LOWEST PRICED CAR

New Automobile Now Being Made to Be Sold at $295—Production Plan Calls for 10,000 Each Month—Has Unusual Features.

THE Spacke roadster, which will be the lowest priced car on the market, probably will be on the market in July. It will sell at $295 f. o. b. Indianapolis. The manufacturer, the Spacke Machine and Tool Co., Indianapolis, is a well financed firm and has been in business for years. The company has had great success in making engines.

The roadster will be marketed exclusively through A. B. Norwalk & Co., Inc., Times building, New York. It is announced that the plan is to produce a minimum of 10,000 cars within the 12 months beginning July 1. The Norwalk company is appointing agents in various parts of the country, and its agents will have samples ready for the public this month.

The car will have the air cooled Spacke 9-13 horsepower De Luxe engine. There will be no differential. It will have a pressed steel racing type body, with two bucket seats, the wheelbase being 90 inches and the length over all 118. It is claimed that the car will travel from 40 to 50 miles on a gallon of gasoline, and will attain a speed of 35 miles an hour.

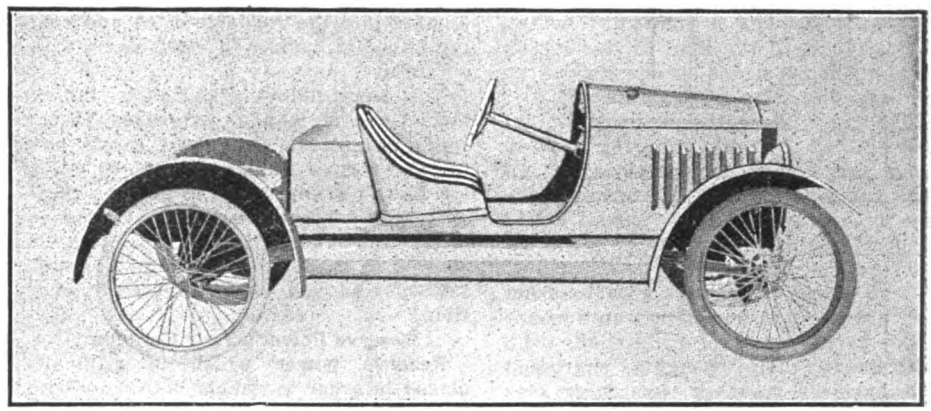
The principle back of each car, according to the manufacturer, is to provide a really inexpensive car, proved in every detail and capable of all requirements of ordinary service. "The Spacke motor car," states the announcement, "cuts the cost of transportation in half. Its first cost is far less than any other car, and the cost of operation and upkeep actually saves half usual cost of a small car.

"This saving is remarkable when you consider that it has attractive appearance and is modeled on the lines of speedsters costing over 10 times the Spacke price. In the great saving that this new type of car brings you do not sacrifice speed or ease of handling. It will give you all the speed the law allows and throttle down to slowest traffic with a quick pick-up to high speed.

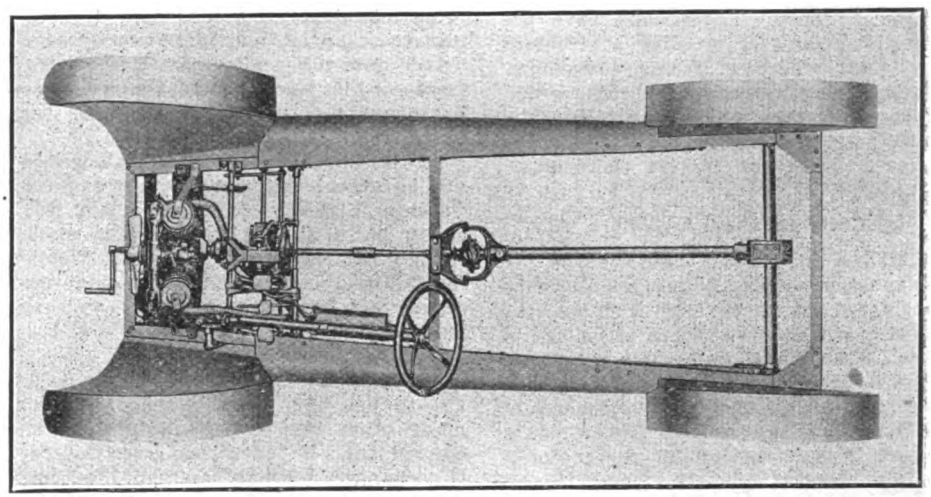
"The secret of the Spacke car is light weight and simplicity. Its design eliminates half the weight of the usual light car and saves you fuel, tires and upkeep in proportion. Its simple, sturdy power plant and working parts make it easy to operate and care for, also adds thousands of miles of service."

The weight complete is 700 pounds. By the addition of the Spacke delivery case on the rear deck the passenger car is made into a serviceable delivery car, the added weight being 55 pounds and the cost $25. An outline of the specifications is as follows:

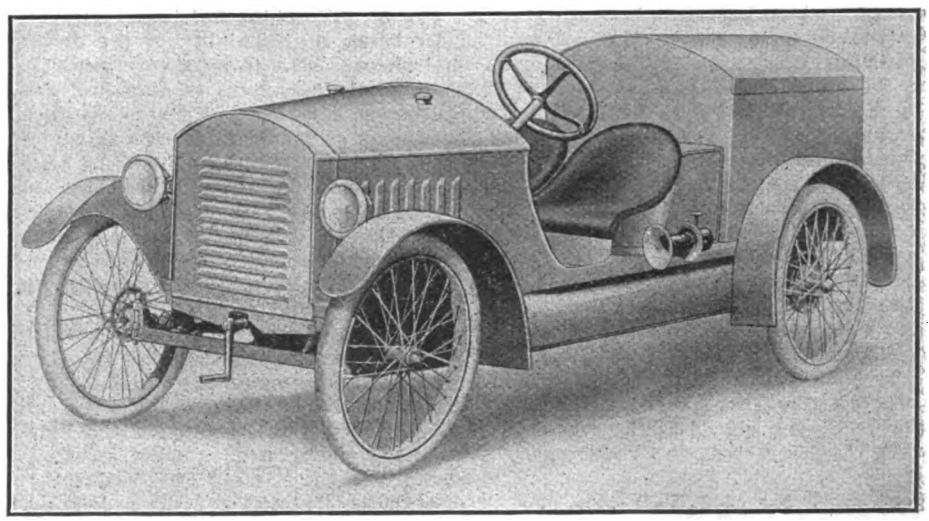
Length overall, 118 inches; wheelbase, 90 inches; engine, Spacke 9-13 DeLuxe; number of cylinders, two; bore and stroke, 3½ inches by 3⅝ inches; horsepower, 9-13; piston displacement, 10.62 cubic inches; camshaft drive, helical gears; cooling, air; lubrication, eccentric pump and splash; carburetor, Wheeler & Schebler; gasoline feed, gravity with foot accelerator; ignition, Atwater Kent, hand control on dash; gearset, (own make) planetary, two speeds forward and one reverse; final drive, bevel gear, six to one ratio; rear axle, bevel drive, 1⅛ inches shaft; frame, pressed steel channel; tires, 28 by 3 inches; wheels, wire, demountable, enameled black; motor bearings, annular ball; rear axle bearing, annular ball; front axle bearing, cup and cone; bodies, racing type, steel body, bucket seats, steel carrier box; weight complete, 700 pounds; delivery box, 55 pounds extra; miles per gallon gasoline, 40 to 50; lights, electric; color, battleship gray; speed, from 3 to 35 miles.



Spacke Roadster.



Spacke Chassis.



Spacke Car with Delivery Case.

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GREAT CAUTION NECESSARY IN MOTORING

VARIOUS commentators have said that traffic collisions and numerous other daily accidents on the thoroughfares do not happen—they are caused; carelessness on the part of some one is at the bottom of them all. Whether the fault is with the man in the car or the man in the street often remains for a jury to determine.

Each year, when the motorist unlimbers his car for the motoring season, safety suggestions come trooping along with the general hope of reducing distressing accidents. The "Safety First" advice is offered liberally to both the autoist and the pedestrian.

There is no doubt that great caution in city driving is imperative on account of the heedlessness of pedestrians who stalk about, their thoughts engrossed with business cares or something else that takes their minds from the possible dangers in crossing streets where the traffic is dense. Pedestrians have the hazardous habit of crossing a street at any point where it seems convenient, not bothering to walk as far as a crosswalk, where they would be protected by traffic policemen and where drivers of vehicles will be anticipating their movements.

Children Play Anywhere.

Children in the city and suburbs are the most important factors of all to be considered, as those who frequent the streets as a playground are of an age in which it is almost impossible to inspire a spirit of caution. They are care free and roam about, entirely unconscious of danger from any source, and for that reason it is necessary for the motorist to take it upon himself to exercise extraordinary caution whenever driving through residential districts, or where there is a school house, as he can never foretell at what moment a child will run from behind some tree or fence and out into the street in the path of his car.

In most cities it is recognized that warnings to the children of the dangers that confront them in the streets is often a waste of breath, so the motorist is called upon to watch for their presence and to use particular judgment in operating in the sections where they are. Most of the large cities have placed signs in the streets, indicating neighborhoods where schools are located and the crossings that are most generally used by the children in going to and from their homes, while several municipalities have traffic policemen placed at the crossings during the hours that the children use them.

Types of Drivers.

There are drivers who never exceed the speed limit and proceed with great caution, but, nevertheless, find themselves in smashups because they are slow witted, and, when confronted with a predicament from which they could easily have extricated themselves with a little presence of mind and action, become stricken into inaction with a paroxysm of fear.

In contrast to this sort there is the over-confident chauffeur who prides himself on escaping through the narrowest openings in the traffic at high speed, or passing a machine ahead by gracefully dipping into the roadside ditch and coming up again, luckily in most cases, without injury.

This same fellow, urged on by the exclamations of wonder expressed by the occupants at his skill, next shows how to take a right angle curve at 50 miles. He doesn't always come to grief on these spectacular stunts, but does sooner or later, and those who urged him or showed so much admiration for his skill, say, "I told you he would get it some time."

Reserve Power's True Function.

Reserve power which is originally placed in a car to enable it to cope with the grades on steep hills and to carry it through adverse road conditions is too often mistaken for a means of developing great speed, and many an average driver does not realize that the requirements of him have greatly changed since he turned the throttle and ran the car up to from 25 to 40 miles an hour.

At the lower speed his attention need not be absorbed in guiding his car and watching highway conditions a long way ahead, but at the higher speed his whole thoughts should be taken up with watching the road as the increased momentum makes all bumps or ruts, as well as moderate turns in the roads, very dangerous.

The distance at which he can come to a stop has also been lessened, and in many other respects the nature of the control that he exercises over the car has changed so that emergency actions are far less effective to avert disaster than they would be at the lower speeds.

"Thinking Safety."

Realizing the fallability of the driver the railroads have in most cases entirely changed their systems of signaling and posting at crossings. Efforts have also been made to inculcate into the minds of the motoring public that whoever directs the car should cultivate the habit of "thinking safety." If this could be accomplished it is believed that accidents would become a rarity instead of so common that they have become appalling in their number and results.

Positive and constructive efforts which are bettering the conditions all the time in circles and communities which do care and strive for betterment lay stress on simple instructions. Many of the automobile manufacturers render great assistance in the "Safety First" education of both the motorist and the pedestrian. All of these sound emphatic warning regarding the children.

Up to Motorist.

"It is up to the motorist to watch the children on the streets and upon him is the burden of avoiding accidents," says a statement issued by the Dort Motor Car Co. "Give the children the advantage of every doubt and there won't be so many accidents to the little tots. When children are on the sidewalk or curb, the driver should swing around as much as possible and lessen the speed so that if a child should do his best to throw himself in front of the car it could not be done.

"Children at play may suddenly break from the group and run at top speed into the path of a car and the motorist should always keep this in mind. Expect the unexpected and you'll be safe. There are a few rules that the children can observe that will decrease the number of accidents, but the motorist must never feel that the responsibility rests at all with the child."

Here are the rules that are suggested for children to be taught:

Look at Driver.

1. Look in both directions before stepping off the sidewalk. The left is most important because all traffic should be coming from that direction.

2. Never walk behind a street car without looking carefully for automobiles or other street cars coming from the other direction. It is much better to walk a little farther to the corner before crossing.

3. When possible always go to the corner where the traffic policeman is on duty. He is your friend.

4. When more than one child is crossing the street hold hands tightly, don't run and don't separate. The driver can miss you if you become confused, providing you stay together, but, if you separate, one of you is almost sure to be struck.

5. If a car is standing at the corner or moving slowly some distance away, look the driver in the eye to make sure that he sees you and to learn what he is going to do. Don't look at the front of the car. Look at the driver.

6. When streets are slippery, don't take a chance in crossing just because a car is moving slowly. A quick stop is impossible for the car, and your action may cause the car to skid and become unmanageable, thus endangering many lives, including your own.

Keep Alert.

7. Don't read letters or books when crossing the street. Don't talk to your friend but keep your mind on the fact that you are crossing a street where there is danger and you must be alert.

8. In playing ball or tennis, if the ball goes into the street, don't run after it without stopping first at the curb to make sure that there are no cars approaching.

9. Cross the street at street corners. In many cities there is a fine for anyone crossing between corners. This is called "jay walking."

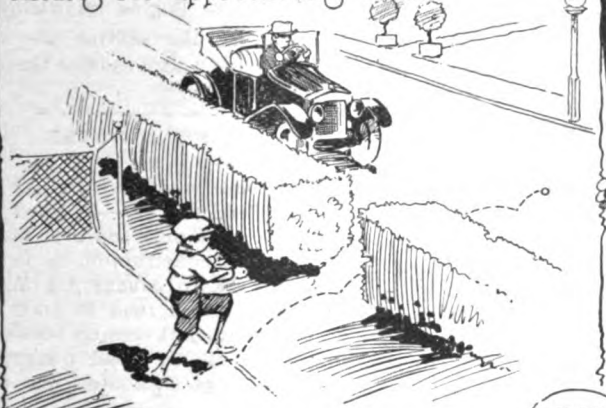
10. Don't play in the streets and don't roller skate in the streets.

11. If the road is the only place to walk to school, walk on the left side facing the traffic. If you walk on the right side you will be in the path of cars approaching from behind.

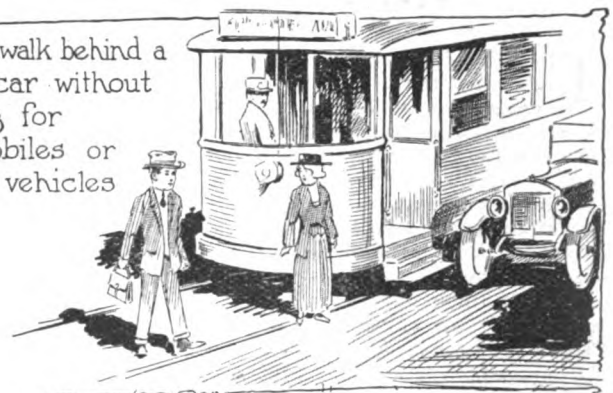
12. Don't "hop on" behind trucks or cars. The danger is in getting off without being able to see in all directions.

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Don't run into the street without first looking for approaching cars.



Don't walk behind a street car without looking for automobiles or other vehicles



Don't read or talk to a friend when crossing the street.



Don't race for a railroad crossing. Let the train have the right of way- play safe.





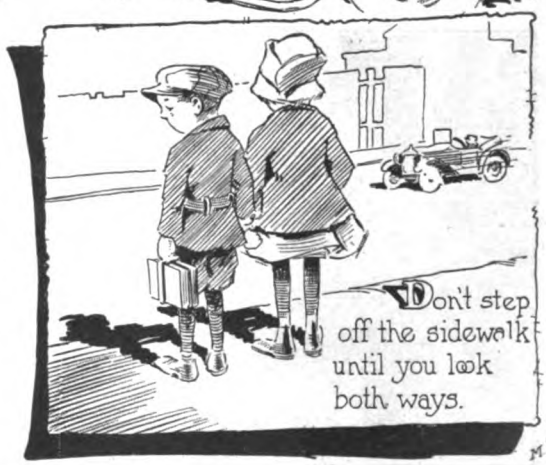
Don't roller skate or play ball in the street.



Let the traffic policeman help you. He's your friend.



Don't "hook-behind" teams or trucks.



Don't step off the sidewalk until you look both ways.

MSW

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AERO ENGINE NOT SUITABLE FOR AUTO

THERE is little of airplane engine design that can be adapted to the auto engine, says Howard C. Marmon, vice president of Nordyke & Marmon Co. His experience as a lieutenant colonel in the aircraft service as chief of experimental engineering at McCook field and his study of airplane engines during two overseas trips to the fighting fronts gave him opportunity to make careful study.

Mr. Marmon says that the demands upon the two engines differ radically. The carburetor problems are diametrically opposed. The airplane demands flexibility through a range of but 30 degrees, while the motor car engine must fire evenly through speeds covering 90 per cent. of the speed range of the engine; in short, the greatest possible flexibility.

The motor car engine must be as quiet as possible, while this factor is never considered in the airplane. Ability to deliver full power through its small speed range with undue vibration is all that is required in the airplane motor. The automobile power plant, on the contrary, must furnish full power at all speeds without any vibration at all.

MARMON TELLS WHY IT CANNOT BE ADAPTED TO MOTOR CAR.

A hypothetical replica of an airplane engine made small enough for motor car use will be much heavier per horsepower than the original airplane motor, continues Mr. Marmon. Its cylinder walls must continue of the same dimension, as must the crank case walls, etc. Ignition, spark plugs, carburetor and many similar parts will be of the same weight. Installed in the car this airplane hybrid replica will have to add a flywheel, a clutch, starting and lighting system and a tire pump. It will then weigh perhaps two-thirds as much as the usual motor car engine.

Trials of this hypothetical hybrid airplane auto engine, he says, would prove it could not be used in city traffic or in heavy pulling over poor roads at low speeds without a new carburetor and a new intake system. Before it could be used by a motorist it would have to be redesigned to correct the excessive noise of the valve operating gears. Then the crankshaft would have to be made stiffer and heavier to eliminate periodic vibration. The final engine would differ but little in weight from an automobile engine.

"The real improvement which will result from our engine knowledge will be apparent in the service the car gives rather than in any radical change in design," he says.

ROAD NOTES.

New York to Albany via the east side of the Hudson river—In good condition except for one mile south of Blue Stores, where road construction is in progress.

New York to Albany via West Shore—Hard surfaced road in good condition except for a short stretch between Kingston and Catskill—road construction in the vicinity of Cementon was completed last fall.

New York to Binghamton via Goshen and Liberty—Hard surfaced road in good condition throughout except for resurfacing, which is at present in progress from Southfields to Harriman.

Hudson and Essex Production Plans Call for 40,000 Cars

HUDSON and Essex production plans this year call for a combined volume of $56,000,000, or approximately 40,000 automobiles. Few persons realize what such a program means or the vast amount of preparation required. The largest previous Hudson business in one year was $28,000,000, as against the $32,000,000 planned for 1919. To this increase was added the Essex production volume of $24,000,000.

In getting ready for this increase in volume, more than $600,000 worth of new machinery was installed and is now in operation. At the same time almost 75,000 square feet of space has been added to the previous total of 1,000,000 square feet in the Hudson factory.

The material on hand—the great quantities of supplies of all kinds necessary to keep the production departments working at maximum efficiency—is valued at more than $6,000,000. All available space in the factory has been filled and the overflow has been piled in great heaps outside—immense stacks of frames, castings, rims, etc.

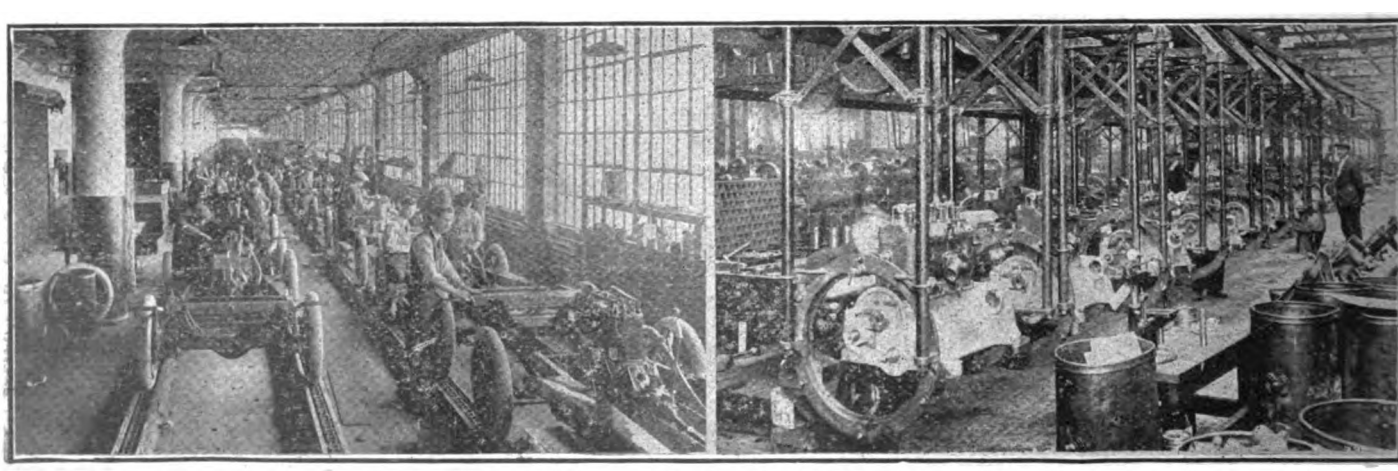
And, at the same time, the number of employees has been steadily growing. Four thousand men, it is estimated, will be engaged in the more than 10,000 different operations necessary to produce Hudson and Essex cars. The greatest previous number of factory employees was approximately 3400.

The machine shop, assembly departments and engine test space occupied exclusively by the Essex division totals 100,000 square feet. The chassis assembly and the final assembly divisions are parallel chains. These, with the paint and body divisions, total 1520 feet in length. The Essex assembly division, which occupies an entire wing in the factory, have been in operaion some time.

The Essex machine shop, cylinder and engine assembly and engine test are located in the building which was constructed in turn out of shells for the government. Every inch of this vast space has been filled with the very latest machinery and equipment of every description. No facility is lacking for the highest quality of workmanship.

The Essex chassis assembly division occupies the space which was used for the assembly of "quad" trucks for the government. Here, too, the perfection of the equipment is notable, many entirely new and exclusive ideas in modern engineering practise having been incorporated in the production methods.

The Hudson factory is one of the best equipped and finest manufacturing plants in the industry, and to this perfection of detail and the ideal working conditions which have been provided for the men is due much to the reputation Hudson has gained for fine workmanship.



Essex Final Assembly Line.

Essex Motor Assembly Line.

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GIVING THE CAR ITS SPRING OVERHAULING

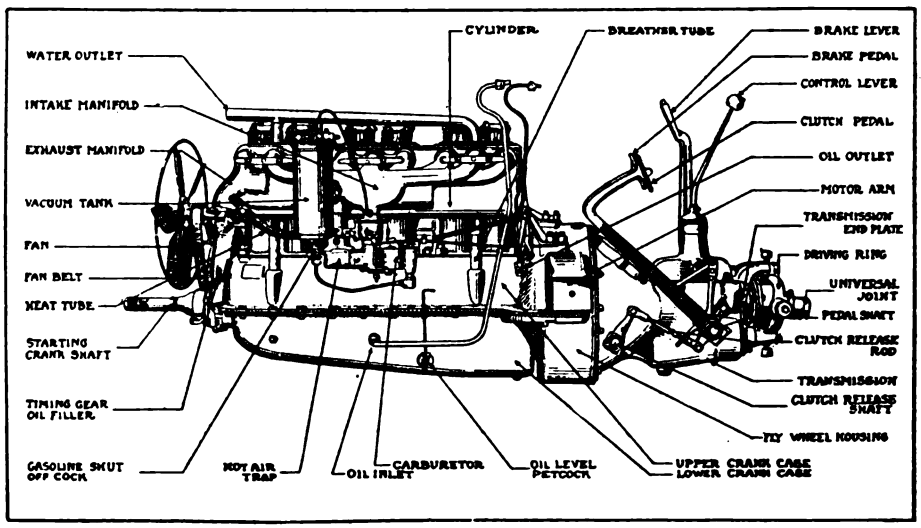
How an Owner May Do the Work in His Own Garage with Such Tools as Are Ordinarily Available—Suggestions as to Adjustments.

THIS article is intended to advise the man who wishes to overhaul his car with such tools as may be ordinarily available and do the work in his own garage. It will practically benefit the man who has bought a used car and desires to do necessary work upon it. This article specifies the various units and parts that will wear and suggests adjustments that should be made. Necessarily it is general instead of specific and the illustrations apply to types rather than makes of cars.

Assuming the owner has the time, inclination and tools and a place to do the work. To make a thorough job, start at the front of the car. After removing the hood disconnect the radiator brace rod extending from the top of radiator to the dash. Remove the radiator intake and outlet connections, take out the bolts that secure the radiator to the frame and place the radiator front down upon the work bench.

Plug the inlet and the outlet at the top and bottom of radiator with wood blocks. Or round pieces of tin may be soldered on to these openings to close them. Stand the radiator on the floor or on blocks and with a hose connected with a pressure water system turn on the water and fill the radiator at the filler. If there is a leak in the radiator cooling section it will be visible. To repair it, scrape the spots with an old knife and cover them with soldering acid, made from a small quantity of muratic acid in which strips of zinc are dissolved. Then apply a solder with a good hot soldering iron. If no leaks are seen, wash out the radiator with a solution of hot water and washing soda. Rinse this out with cold water two or three times, take out the plugs and lay the radiator on the bench.

The bore couplings of the water manifolds are next taken off the engine. Then disconnect the gasoline feed pipe, first shutting it off under the tank, if a gravity feed, or beneath the vacuum tank if a vacuum feed. Take off the fuel intake manifold. When this is disconnected the exhaust manifold is usually loosened and can be taken off at the same time. Do not change the carburetor adjustments. If the engine is equipped with a vacuum tank this should be removed. When disconnecting the feed pipe on the top, that leads from the main tank, look for dirt or sediment in the small strainer at the end of the pipe. Sometimes dirt will work through from the main tank and collect in this strainer. All gasoline should be strained, but since public measuring tanks are the principal sources of supply, this is almost impractical. Small particles of rubber from the filling hose may get into the main tank and be separated by this strainer.



Carburetor Side of Six-Cylinder Engine.

Care in Disconnecting Wires.

Disconnect the generator from the side of the engine by removing the bolts. Tag all the wires that lead to it, so that in assembling they may be connected as originally installed. Do the same with the motor. If it is geared to the flywheel it will slip out when the bolts are removed, but if chain driven, disconnect the chain and the motor can be easily removed.

The motor and generator should be carefully examined for wear. This may be found in the bushings and on the commutator where the brushes make contact. If wear is evident it will be best to either send the machine to the factory where it was made or to a repair station having the facilities for electrical repairing. This also applies to the motor. If no appreciable wear is noted and the units have been doing good work, lay them one side. All wires should be disconnected and laid back against the dash and marked for connections.

If the engine is a one-piece base type and is to be taken out of the chassis, disconnect the pedals and the brake and gear shift levers. After removing the bolts that hold the engine in the frame, pass a chain around it. Hitch a chain to a beam over head, hook a chain fall to this, run the car underneath it and with the hoist lift the engine out. Roll the car back and lower the engine carefully onto a horse or table. Place the engine so you can reach it from all sides. A portable stand for engine overhaul can be made by any carpenter or a couple of pieces of joist nailed to a pair of wooden horses will serve.

If the engine is a detachable head type, remove the head by taking out the long bolts that secure it to the cylinders. Next with a screw driver or similar tool pry lightly between the head and the gasket that is fitted under it. Tapping with a light hammer on the head may help this operation. When the head has been removed, take off the gasket and examine both sides carefully. If this gasket is damaged you should get a new one.

Removing the Valves.

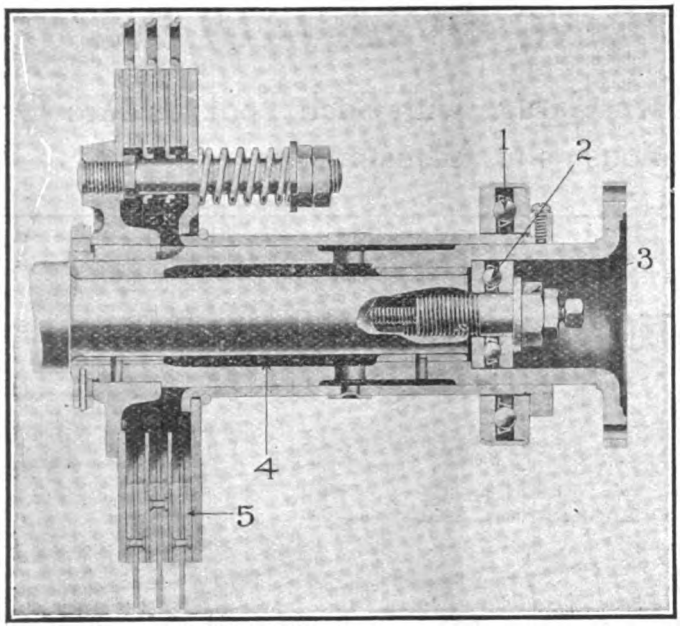
If the motor is an L or a T head type the caps over the valves and the spark plugs should be removed. If a valve-in-the-head type with cages to hold the valves, the rocker arms should be pressed forward with a small wrench to release the push rods, when the push rods may be taken out. With a drift wrench usually found in the tool kit, turn out the lock rings that hold the cages in place, being careful not to damage the small bronze packing rings underneath them. Take out the valves and cages, laying them in the order they come from the cylinders.

In the separable head type engine the carbon can be taken out by scraping, care being taken to see that the pistons are at the top of their stroke and the valves closed before starting operations. When free of carbon take a piece of waste and wipe off all small particles left in sight. Clean all the cylinders in the same man-



Removing the Valves from a Ford Engine.

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Clutch Assembly—1, Throw Out Bearing Assembly; 2, Hub Thrust; 3, Hub Thrust Bearing Retainer Screw; 4, Crankshaft; 5, Clutch Driving Plate and Clutch Plate Lining.

ner. In L and T type engines, as well as the cage type, the best and quickest way to clean carbon is to use the burning process. This method requires oxygen and is practically the same as that used for autogenous welding; all the additional equipment needed for this work being a special reducing valve and a simple special torch for burning the carbon.

If one wishes to make use of special scrapers sold by dealers for this work he can do so. These can be bent into various shapes to reach all parts of combustion chambers, and with them fair jobs of carbon cleaning can be done.

Regrinding Old Valves.

In the L and T head and separable head type engines the valves are ground, either in the cylinder blocks or in the head, and in the cage type they may be taken to a bench and held in a vise for grinding. With a screw driver for a lever and a block of wood for a rest, pry on the valve springs. This will loosen the tension on the pins that hold the springs and the pins can be pulled out. Pull or push the valves out at the top, allowing them to rest in the bushings. With the valve-in-the-head type, clamp the vise lightly to the valve stem, holding the cage with one hand. Now slide the stem into the jaws of the vise till they reach the small head piece back of the spring. Put pressure on the cage to compress the spring and draw out the pin. Slip the valve and cage out of the vise and the spring will come off very easily. The valve may now be ground in the cage. Slip the valve out of the cage and apply some good grinding compound (not emery) and put it back into the cage. Holding one end of the stem in a vise, give it a rotating motion, back and forth, and continue grinding till a bright ring 1/32 inch width is shown around the ring and seat.

The valves in the other type motors are ground with a special grinding tool and in the cylinder. Several electric grinding tools can be bought that do this work especially well.

If the motor is a separable head type the pistons may be taken out through the top. First take out all the bolts that hold the lower half of the engine base to the upper half. Take this down carefully. Notice whether oil pipes are connected to it and if so disconnect them. The oil pump in the lower corner of the base will usually come away with the base without disturbing any of the connections. The oil had best be thrown away, as fresh oil should be put in when the base is later assembled. The connecting rods can now be disconnected.

In some engines this can be done by removing the hand hole plates on the side of the base, loosening the bolt that holds the bearing, and dropping the bearing down on one side. This type is known as the marine type bearing. In the great majority of engines the bearing is reached from underneath after the base has been dropped. Cut the wires that run through the holes in the ends of the bolts and take off the nuts. Then remove the caps. Be careful not to loose the shims on the side of the bearings.

Repairs for Scored Cylinders.

The pistons, if the motor is a separable head type, may be pushed out through the top of the cylinder. If the solid head type, draw the pistons down by the crankshaft, taking them out from underneath. Sometimes it is best to remove the nuts that hold the cylinders to the crank base and lift off the cylinders. This gives one a better chance to examine the cylinders for scores in the walls. Deep scores can be filled by a plating process, of which the New Chemical Process Co., 6 West Ross street, Wilkes-Barre, Pa., is specialist; or by the oxy-acetyline welding method. When the latter method is used the work should be done by experts. Still another repair is possible by reboring the cylinders and fitting oversize pistons and rings.

Examine the pistons and rings for wear and if they are excessively worn it will be wise to replace the worn parts with new.

Examine the wristpin bushings. If there seems too much wristpin play new bushings should be put in. If both wristpins and bushings are worn badly, renew both. Where the connecting rod is clamped to the wristpin and that member oscillates in the piston bosses the wear will usually be indicated on the bronze bushings pressed into the piston. These are easily renewed.

Care of the Bearings.

The principal bearings found in the base of an engine are the plain type and are usually of babbitt or similar antifriction metal for the crankshafts and connecting rod big ends, phosphor bronze for the camshafts and wristpins and occasionally white bronze for the camshafts.

Ordinarily the main bearings of the crankshaft, if slightly loose, can be taken up by removing with shims. There are usually three shims on each side, the thinnest being at the bottom. Simply remove one shim from each side of a bearing. Do not make the bearing too tight. The bearing cap draws against the shims and not against the bearing. If drawn too tight against the shaft the metal will burn out, and if left too loose it will pound and perhaps strip the bolts.

To test, spin the crankshaft. If it spins easily the bearing is not tight enough. Loosen the cap and take out shims on each side till a point is reached where a moderate pressure on the crankshaft will turn it. The rear main bearing usually requires attention first on account of the weight of the flywheel upon it.

Many mechanics taking up bearings test them by getting the caps seated until the flywheel can just be moved. In other words, after a little practise they can tell just how tight bearings ought to be by turning the crankshaft. When the bearings have been taken up don't forget to see that all nuts are securely tight and the cotter pins inserted. If the bearings are not fitted with shims then the sides of the bearing and caps must be dressed with a file to make a closer fit.

Crankshaft.

While the engine is dissembled, the crankshaft should be examined to see if its journals are scored. If scores are found put the shaft in the vise and smear a mixture of oil and carburendum on cloth strips. Wrap one of the strips once around the shaft where the score shows and holding an end in each hand draw the strip back and forth. This will take out small scores and polish the shaft.

The bearings should be fitted to the shaft one at a time and then loosened, so that the next may be adjusted until all fit well.

Refitting the Pistons.

Examine the pistons for wear if a slap has been noted, as this may have been caused by a cylinder being worn out of round. While it is important that the piston be a good fit in the cylinder, it is mainly upon the piston rings that compression depends. The piston should fit the cylinder with but little looseness, the usual practise being to have the piston about .001 inch smaller than the bore for each inch of piston diameter at the point where there is the least heat, or at the bottom. It is necessary to allow more than this at the top of the piston because of its expansion.

The clearance is usually graduated and a piston that would be .005 inch smaller than the cylinder bore at the bottom would be about .0065 inch at the middle and .0075 inch at the top. If much more play than this is evidenced the piston will "slap" in the cylinder and will be worn at the ends more than at the center. Pistons sometimes warp out of shape and

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are not truly cylindrical. This results in "high spots" rubbing on the cylinder while the "low spots" will be blackened where gas has leaked by.

Mention has been made of the necessity of reboring or regrinding a cylinder so scored or scratched that gas may leak by the piston rings. When a cylinder is ground out a larger piston must be fitted to the enlarged bore. Most manufacturers are prepared to furnish oversize pistons. Four oversize dimensions have been adopted by the S. A. E. for rebored cylinders. These are .010 inch, .020 inch, .030 inch and .040 inch larger than regular dimensions. Care should be taken in reboring cylinders to adhere as closely as possible to one or the other of these sizes.

All gas engine pistons are fitted with two or more packing rings and these frequently need inspection rather than the pistons. If badly scored or scratched so gases may leak by, they had best be replaced with new rings, either a regular or oil proof type.

The best way to remove old rings is to insert three thin strips of metal beneath the rings at equal distances around the circumference, taking one ring at a time. Grasp a ring firmly with the fingers of each hand and it will slide off easily.

Putting in New Rings.

New rings should be carefully fitted to the grooves of the piston. The tools required are a large piece of emery cloth, a thin, flat file, a small vise with copper or leaden jaw clips, and a smooth, hard surface such as is afforded by the top of a surface plate or a well planed piece of hard wood. After making sure that all carbon deposits have been removed from the piston grooves, three rings are selected, one for each groove.

The ring is turned all the way round its circumference into the groove it is to fit, which can be done without springing it over piston, as the outside edge of the ring may be used to test the width of the groove just as well as the inside edge. The ring should be a fair fit and while free to move circumferentially there should be no appreciable up and down play. If the ring is a tight fit it should be laid edge down upon the piece of emery cloth placed on the surface plate and carefully rubbed down until it fits the groove. It is advisable to fit each piston ring individually and to so mark them they will be placed in the grooves to which they are fitted.

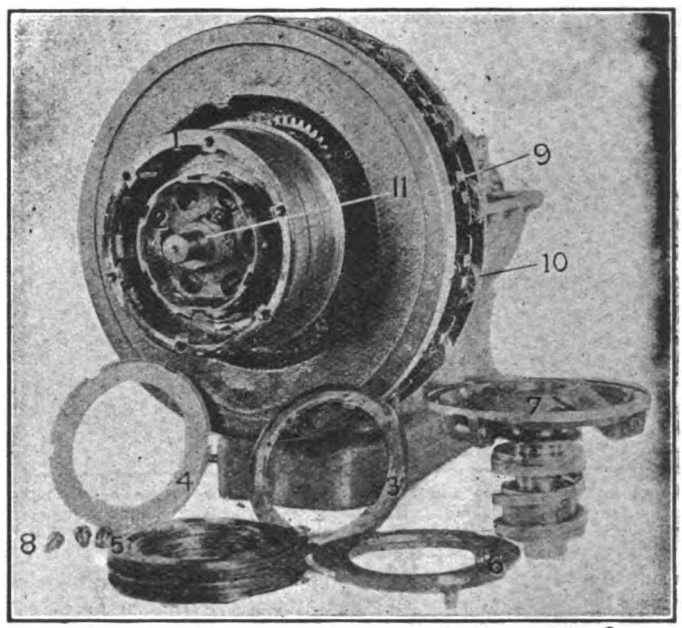
The ring should be fitted to the cylinder itself. It should be pushed into the cylinder at least two inches up from the bottom and endeavor should be made to have the lower edge parallel with the bottom of the cylinder. If the ring is slightly larger than the cylinder bore this will be evidenced by the angular slots of the rings being out of line or by difficulty in inserting if a lap joint type.

If such is the case the ring is removed from the cylinder and placed in the vise betwen the soft metal jaw clips. Sufficient metal is removed with a fine file from the edges of the ring at the slot until the edges come into line and a slight space exists between them when the ring is placed in the cylinder. It is important that this space be left between the ends, so it will not jam when heated and expanded.

If the old piston rings are bright all around, but appear to have lost their elasticity, a new lease of life may be given by "peening." The ring is stood on a surface plate and tapped inside with the peen end of a light hammer, using harder blows at the thick section and gradually reducing the weight as the slot is approached. If skillfully done a ring may be stretched to some extent and considerable elasticity imparted.

Starting and Lighting System.

Usually there will not be much need to overhaul the starting and lighting system, as defects in these units are repaired as they develop. If you think an overhaul desirable examine the bearings for wear, end play and side play. If the brushes are worn greatly they should be replaced with new. If the commutator is coated with oil so that the brushes do not make a good contact, it may be cleaned. To do this take a strip of sandpaper about three-fourths of an inch wide and with a piece of wood flattened on one end hold the sandpaper against the commutator, having a good flat bearing surface upon it. This will brighten the surfaces of the commutator segments and clear it. A very small amount of vaseline should be applied to the commutator after cleaning. Three-in-one oil is also good for this purpose. The work should be done with the motor running slowly.



Transmission with High Speed Clutch Partially Disassembled: 1, Brake Drum; 2, Disc Drum; 3, Master Disc or Distance Plate; 5, Internal Driven Clutch Plate; 6, Clutch Push Ring; 7, Driving Plate and Assembly; 8, Driving Plate Screws; 9, Magneto Magnets; 10, Magneto Field Coils; 11, Disc Drum Set Screw.

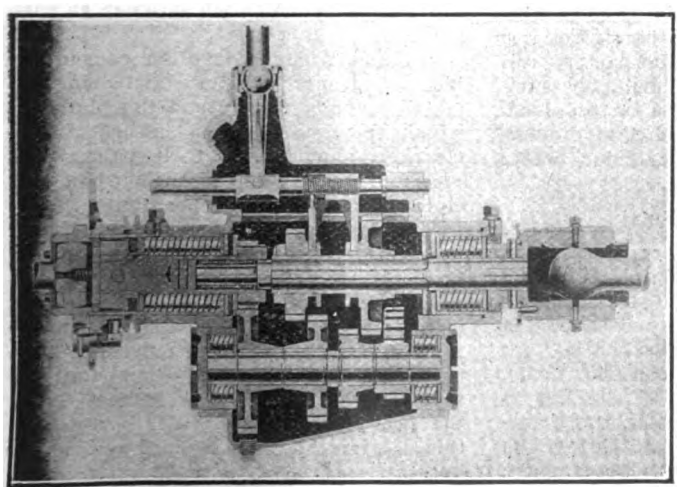
If there is need of repairs to either the motor or generator, such as short circuits or broken wires, the repairman will get the best results by sending them to the factory where made or else to a repair shop making a specialty of this work.

Care of the Carburetor.

A good make of carburetor under normal conditions will not fail, and in overhauling it is best to remember this fact. If the car has been running well on the carburetor setting before the overhaul it is needless to say that adjustment is unnecessary after the engine has been reassembled.

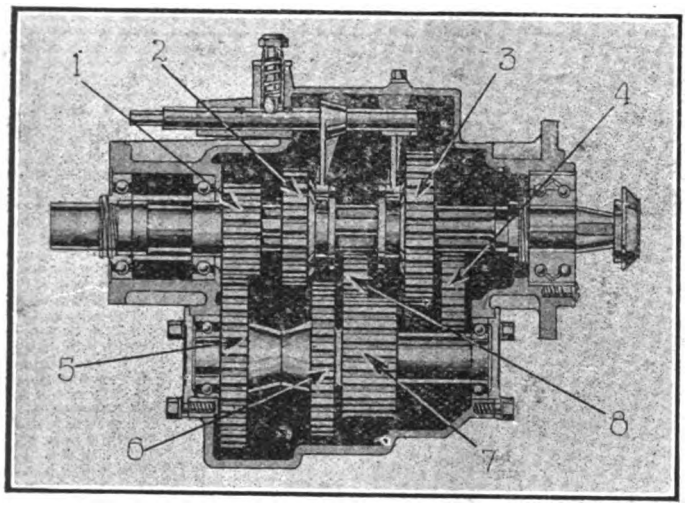
If it is found necessary to make adjustments the following will be found useful. The first and most important thing to learn about any carburetor is to let it alone as long as it is working normally. Never tamper with the carburetor until you are quite sure that it is defective.

Test the engine for compression, see that there is a good hot spark occurring in each cylinder and gasoline in the tank. If the engine cannot be started, first flood the carburetor by holding the choker wire in the pulled out position on the dash, or, in the older type cars, by holding down the priming pin on the top of the carburetor, above the float chamber. If gasoline does not appear, look for a leak or an obstruction in the pipe, a closed shut-off valve or a dirty strainer. If the tickler shows gasoline in the float chamber look for a clogged spray nozzle. If the carburetor floods or leaks gasoline when the car is standing, look for an obstruction under the float valve. If the engine starts, but a popping noise is heard in the carburetor when the throttle is suddenly opened, it indicates a lean mixture. Open the needle valve slightly



Cross Sectional View of Transmission.

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Phantom View of Transmission Gearset: 1, Drive Gear; 2, High and Intermediate Gear; 3, Low and Reverse Gear; 4, 8, Reverse Idler Gears; 5, 6, 7, Countershaft Gears.

or put in a larger jet if there is no needle valve. If the engine runs sluggishly with a black smoke at the exhaust, it indicates too rich a mixture. Close the needle valve slightly. If the engine does not idle properly, or lacks "pep" at higher speeds, close the air adjustment slightly, and if not already too rich at low speed, the gasoline needle valve may also be loosened slightly by turning to the left.

The above will apply to practically all carburetors in use save the latest types, where adjustments are more complicated. With these carburetors one had best be guided by the printed instructions given by the manufacturers, as they are so varied and the adjustments so fine that it would be practically impossible to do justice to them in this article.

Precautions in Reassembling.

When all essential parts of a power plant have been looked over and cleaned and all normal conditions restored either by adjustment or replacement of worn parts, the engine should be reassembled. As each part is added care should be taken to insure adequate lubrication of all new points of bearing. In adjusting the crankshaft bearings tighten them one at a time and revolve the shaft each time one of the bearing caps is set up to insure that the newly adjusted bearing does not have undue friction. All retaining keys and pins must be positively placed and it is a good practise to cover such a part with lubricant before replacing it because it will not only drive in easier, but the part may be removed more easily if necessary at any future time. If not oiled, rust might collect around it.

When a piece is held by more than old bolt or screw, especially if it is a casting, the bolts should be tightened uniformly. If one bolt is tightened more than the rest the casting may break. Spring washers, check nuts, split pins or other means of locking should always be provided, especially on rotating parts or those subject to a load. Before the cylinders are replaced on the engine base, heavy brown paper gaskets should be made to place between the cylinder base flange and the crank case. The best method of making these gaskets is to tamp them out by placing a sheet of brown paper over the mouth of the cylinder and directing a series of light blows with a machinist's ball peen hammer against the edges of the casting. This will cut the paper exactly to the form of the base flange and cylinder bore. The holes in the flange may be indicated in like manner or may be punched with a drift. The same process may be used in making irregular shaped gaskets of other materials, such as asbestos or rubber packing.

Before placing the cylinders over the pistons it is imperative that the slots in the piston rings are spaced equidistant and that the pistons are copiously oiled before the cylinders are slipped over them. When reassembling the inlet and exhaust manifolds it is well to use only perfect packings or gaskets and to avoid the use of those that seem to have hardened or flattened.

If new gaskets are used place a full set on the joints of the manifolds, because if old and new gaskets are used together the new ones may prevent the manifolds bedding fully upon the used jackets. It is well to coat the threads of all bolts and screws subjected to heat, such as cylinder head and exhaust manifold retaining bolts, with a mixture of graphite and oil. Those that enter the water jacket should be covered with white or red lead or pipe thread compound. Gaskets will hold better if coated with shellac before the manifold or other parts are placed over them. The shellac fills any irregularities in the joint and prevents leakage after the joint is made up and the coating has set.

In replacing cylinder head packings on cars like the Ford it is well to run the engines for a short while, several minutes at the most, without water in the jackets, to heat the heads thoroughly. It will usually be found posible to tighten all the cylinder head retaining bolts after this is done, because if the gasket has been coated with shellac the packing will be fully bedded. Care should be taken when using shellac, white or red lead, etc., not to supply so much that the surplus will run into the cylinder, water jacket or gas passages.

Adjusting the Clutch.

The clutch is next to receive attention in the overhaul. The clutch is placed between the motor and transmission gearset to disconect the power of the engine from the driving system so that changes in gear ratios can be made. There are several types of clutches in use, the most common being the planetary, the leather faced cone clutch, the disc clutch, dry type, with steel plates bearing against steel plates faced with asbestos, and the disc plate clutch running in oil, where the plates are steel against bronze. This latter type is now seldom used.

In the planetary type the adjustments are made in the transmission case in the case of the reverse and brake bands, and on the outside of the case in the case of the first speed band. The high speed adjustment is found on the end of each finger and is a small set screw nearly flush with the face of the arm.

There are three of the screws, one on each arm, and they should be adjusted equally. Lubrication is supplied from the oil in the flywheel case. If the linings of the bands are worn it is advisable to reline them.

The cone clutch usually is leather faced, but some have linings of anti-friction material. This may serve, but will wear, especially if the driver slips the clutch a great deal. The most durable lining is leather lining, as when worn it can be renewed by putting on an entirely new facing, riveting it to the rim of the cone. If the cone clutch facing becomes covered with oil the clutch will slip. This may be prevented by applying a small amount of "Fuller's Earth," holding out the clutch with the clutch pedal and using a hack saw blade to apply the "Fuller's Earth" to the lining. Sometimes the clutch will grab quickly, causing the car to start with a jump. This may be corrected by holding out the clutch pedal and applying a small amount of "neatsfoot oil" to the lining.

The cone clutch engages with the inside of the flywheel rim. It is held in position by four springs, the tension of which can be adjusted to take up wear of the clutch facing by the nuts on the ends of the studs which fasten them to the flywheel. In adjusting the tension of clutch springs be careful to turn all adjusting nuts the same to prevent throwing the clutch out of line.

Every 500 miles the grease cups on the different bearings of the clutch should receive attention. Use soft grease in the cups and give them two turns each. Apply soft oil to the clutch release yoke trunnion bearings.

The dry disc clutch consists of steel plates, every alternating one being covered on both sides with asbestos facing, riveted in place. These discs require no oil or attention in any way except to avoid slipping the clutch as much as possible.

A slipping clutch is often caused by lack of proper clearance between the clutch opening fingers and the plate on which they strike when in use. This clearance should never be less than 1/16 inch nor more than ⅛ inch when the clutch is in the driving position.

The clutch opening fingers are held in the arms, which are clamped in position on the shaft by the clamp bolts and are not keyed to the shaft. This provides means for setting the opening fingers so that they strike the throw out collar simultaneously, which is very important, so that the clutch may work perfectly and the gears shift easily, as failure to do this is often the cause of hard gear shifting.

The clutch closing springs in recesses

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in the flywheel and their pressure should prevent the clutch slipping, but never so heavy that the foot pedal can be operated only with exertion. The pressure may be varied by screwing the nuts in or out. Never loosen these nuts to such a degree that the caps covering the springs will be forced out of the holes and hook over the edges, as this will prevent releasing the clutch.

Continued clutch slipping under heavy loads and high engine speeds causes the discs to heat. When heated the clutch will not hold as well as at slower engine speeds and the plates are cooler. Do not engage the clutch suddenly with engine at high speed. This will heat and warp the steel discs and the copper rivets will show above the asbestos facings. These rivets should be kept well peened, as the clutch will chatter when engaged if they are above the surface of the facings. The discs must be kept dry and free from lubrication.

The ball thrust bearing should be oiled every 500 miles. When oiling hold the oil can vertical so the oil cannot get beyond the bearing and into the clutch discs. The clutch inner roller bearing is packed with grease when assembled and it will receive sufficient lubrication through the universal joint unless the clutch, through misuse or poor adjustment, is heated. The clutch transmission joint should be oiled about every 500 miles by forcing in heavy grease by the grease cup.

Removing the Transmission Gearset.

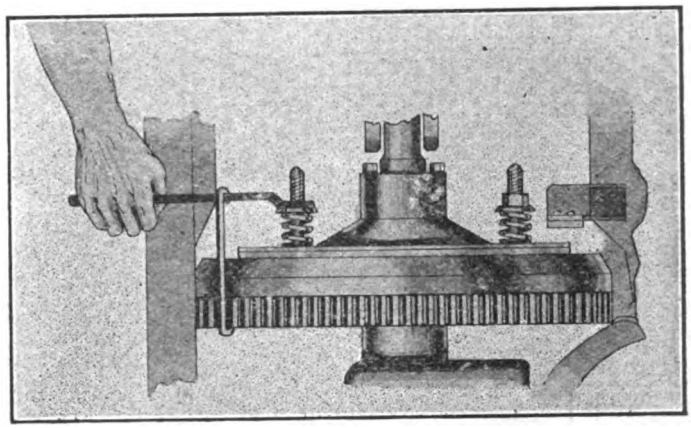
There are but three types of transmission gearsets in general use, the planetary, used in Ford cars; selective, used in a great majority of pleasure cars, and the friction type.

The transmission gearset applies the engine power slower by varying the speed of the driving wheels when climbing steep grades, driving on soft surfaces, starting or reversing.

In the planetary type the gears are always in mesh and revolve around a main axis. The different sets of gears are actuated by stopping the revolution of the parts which support them by means of bands (similar to brake bands). The planetary transmission is the simplest and most direct means of speed control. Its adjustment is by adjusting nuts on the inside and outside of the transmission case. The high speed adjustment is on the rear end of the transmission. There are three arms, each having an adjusting screw. These should be taken up equally, otherwise the high speed clutch will not engage evenly.

The transmission is lubricated by the oil carried in the enbase.

The universal joint of this transmission system is located just back of the transmission case and is lubricated by a grease cup. This should be kept full and screwed down occasionally.



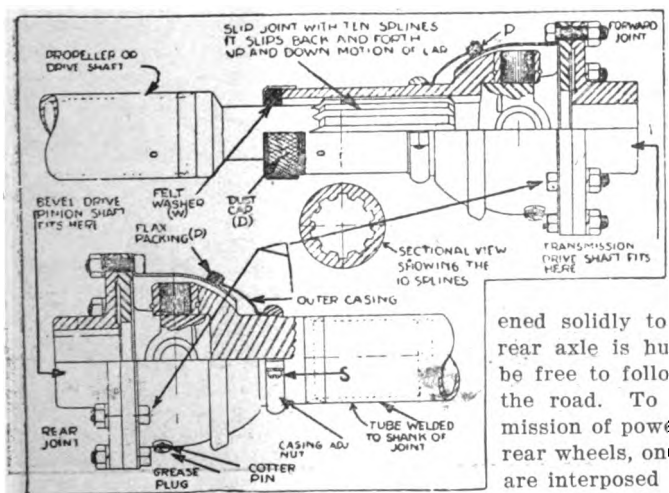
Adjusting the Springs on Cone Clutch.

A sectional view of a selective sliding transmission gearset is shown. The bearings are either ball or roller type, non-adjustable except in an endwise direction to allow for lining the gears.

The lubrication of this type of transmission gearset is by heavy oil carried in the case. This oil should not be higher than the lower side of the smallest gear on the upper shaft. A heavy steam cylinder oil is used generally as a gearset lubricant. The oil should be such consistency that it will follow the gears readily and not pile up beside or behind them when running. A steam cylinder oil sold under the name of "600 W" is a good gear lubricant, especially if mixed with a little flake graphite. A mixture of two-thirds ordinary cup grease and one-third gas engine cylinder oil, mixed with little graphite, serves very well. The oil should be replenished about every 1000 miles. Remove the oil after about 2500 miles running and replenish with fresh lubricant.

In overhauling the transmission gearset note if the edges of the gear teeth are burred. Those not badly burred may be smoothed with a coarse file. If heavily burred, face them with an emery wheel.

Some selective type transmission gearsets are amidship in the chassis, some combined with the engine and clutch and others are in front of the rear axle. The principle is the same in all types.



Front and Rear Universal Joint.

The friction type transmission is found in some cars.

The universal joints in all cars are much the same construction. Their purpose is to offset the drive from the motor and transmission gearset to the rear axle. The transmission gearset is fastened solidly to the car frame, but the rear axle is hung on springs and must be free to follow the uneven surface of the road. To obtain continuous transmission of power from the gearset to the rear wheels, one or more universal joints are interposed between them. It consists principally of a cross, the arms of which constitute four bearings. A yoke attached to the squared shaft of the gearset is connected to two of these bearings, while the splined yoke that slips on the forward end of the driving shaft is connected to the other two. This joint is enclosed in a sheet metal housing and should be kept filled with soft cup grease. The filler is closed by a plug.

In overhauling the universal joint look for worn bushings. These should be replaced with new if too badly worn.

In some cars a second universal joint is at the rear end of the driving shaft, usually in duplicate of the one at the forward end.

The Propeller and Pinion Shaft.

The propeller shaft transmits the power to the gears of the rear axle. In some cars it is enclosed its entire length in a steel tube carrying a driving yoke at its forward end mounted on the rear of the transmission. The driving effort from the rear wheels is transmitted by the tube through the transmission case to the frame of the car. The tube also absorbs the torque of the axle. The rear end of the propeller shaft is coupled to the pinion shaft, which is mounted on ball bearings and carries the driving pinion which meshes with the master gear of the differential gearset.

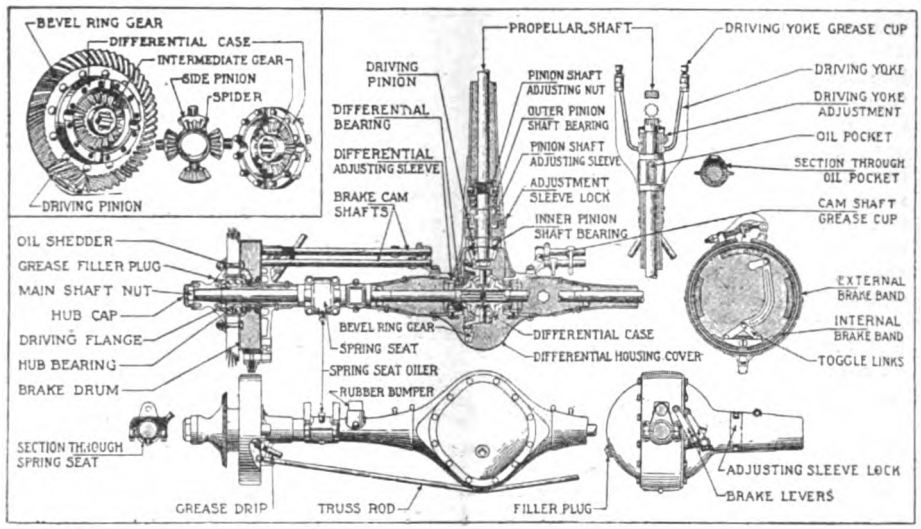
At each end of this tube is a grease cup. Keep these filled with grease and turn them down a couple of turns about every 500 miles. Beneath these grease cups are Hyatt roller bearings that require lubrication.

In cars fitted with shafts with two universal joints, provision is made for compensating the driving thrust and torque of the rear axle. When single universal joints are used these stresses are taken by the torque tube. But with two universal joints this is not possible. In some cars so equipped a torque rod extends from the side of the transmission case to the rear axle at the differential housing. This rod may become loose and rattle. By a nut and bolt adjustment this rattle can be eliminated, or a new bolt may be fitted.

Different Types of Rear Axles.

The rear axle seldom needs attention save when the car is overhauled. In some types one may get at all essential parts without removing the axle from the chassis. In other types it may be necessary to disassemble the axle to ob-

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Disassembled View of the Rear Axle.

tain access to the differential gears, the axle shafts and supporting bearings.

Various types of axles used in automobile construction are usually defined as semi-floating, three-quarter, seven-eighths and full floating.

In the semi-floating axle the entire weight of the car is carried upon the axle shafts, which transmit the power from the differential gearing to the wheel hubs. The driving shafts are usually held in place by split rings around the shafts, fitting in grooves outside the differential, or held by flanges just inside the roller bearing on the outer end of the axle housing.

In the three-quarter floating axle the shaft is subjected only to torsional strains or to a twisting action due to the power applied to drive the car. The wheel bearing is mounted on the axle housing instead of inside of that member. The weight of the car is on the non-rotating axle housing instead of on the shaft. The seven-eighths floating axle is sometimes termed a single bearing, full floating type. It has some of the advantages of the three-quarter floating type in that the drive axle tends to steady the wheel, and also has the advantage of the full-floating type in that the wheel may be removed without taking the housing apart. The axle shaft may be withdrawn from the differential, which is not possible when the ends of the shafts are retained inside the differential bevel gears.

In the full-floating type the driving shaft does not steady the wheel, which is held against side movement by spacing the wheel hub bearings on each side of the spoke center line. With this type the driving shaft may be withdrawn without removing the wheels or jacking up the axle, and the differential gearing may be removed from the rear housing construction by partially jacking up the axle, as the wheels will support it.

To remove a semi-floating rear axle for repair it is necessary to remove the rear system entirely from the car. This means disconnecting the spring clips, the brake rods, torsion rod or tube, and with the car jacked or slung from overhead, removing the axle and drive shaft. It may then be placed on boxes or horses for further disassembling.

Taking Out the Rear Axles.

To take out the rear system disconnect the universal joint. The two plugs at the top and bottom of the ball casting must be removed. Then turn the shaft until the pin comes opposite the hole. Drive out the pin and force the joint away from shaft. In disassembling the rear axle with the universal joint disconnected, disconnect the radius rods and loosen the nuts on the studs holding the drive shaft to the rear axle. Next remove the nuts holding the axle housing together over the differential. The axle housing, in two parts, is then removed from axle shafts. Take the inner part of the differential casing apart and draw the axle shaft through the casing at the center. When replacing the axle shafts be sure the rear wheels are firmly wedged at the outer ends and keyed. If the rear axle or wheel is sprung by skidding or striking a curb, or if the axle shaft is bent—replace it at once. The pinion end of the drive shaft is tapered to fit the pinion, which is keyed onto the shaft, and additionally secured by a cotter pin and castellated nut. Remove the castellated nut and drive the pinion off. No adjustment is provided. Fit new parts if worn.

In removing the differential gears of the semi-floating type axle one will find the gears are keyed onto the axle shafts and held in position by rings or split washers, which are in two halves and fit in grooves in the shafts. Force the washer down on the shaft, away from the end on which it is secured. Drive out the two halves of the ring with a screw driver or chisel. Then the gears can be forced off the end of the shaft. While the rear system is disassembled the brake shoes should be examined for wear.

The three-quarter floating axle cannot be taken apart until the wheels have been removed from the axle shafts. It is necessary to take the pinion shaft off before the differential housing can be split vertically. In Overland cars rear system having three-quarter floating axles it is not necessary to take the rear construction apart as the differential may be removed from the housing by taking off an exceptionally large cover plate. It is necessary, however, to take the wheels off to withdraw the axle shafts.

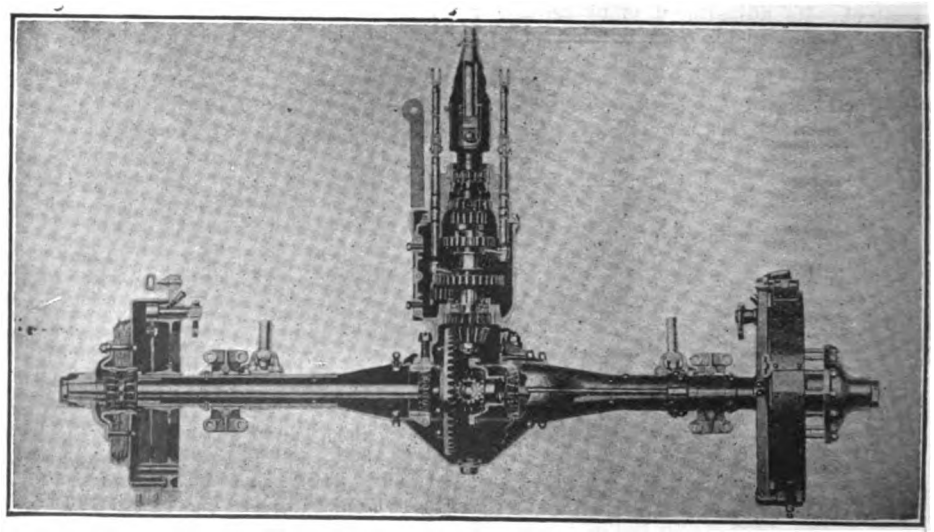
The gears are meshed by a simple adjustment member which moves the pinion drive shaft back and forth in its supporting housing until the proper degree of engagement with the ring gear is obtained.

The Full Floating Types.

To remove an axle from a full floating axle, unscrew the hub cap and pull the driving end of the shaft out of the slots in the wheel hub into which it fits. The driving end of the axle shaft is fitted with a clutch member that fits into depressions milled into the wheel hub. Sometimes the clutch plate will become loose in the wheel hub because of wear of the clutch teeth or slots in which it engages. If the wear is not too great the clutch plates may be expanded by heating the edges of the clutch plates and expanding them by hammering and then filling them to fit.

After the axle shafts are withdrawn the wheels can be removed by unscrewing the locking nuts that hold the bearings in the axle tubes. The wheels can then be removed with their supporting bearings.

To remove a differential gear assembly, one must first withdraw the axle



Rear Axle and Transmission Assembly.

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shaft completely from the differential gears and releasing the differential bearing holding caps by unscrewing the retaining nuts or cap screws. The differential gearset may then be removed from the housing as a unit with its supporting bearings. In this construction it is not necessary to readjust the bevel gearing because the adjustment need not be disturbed when the assembly is removed. This is a marked advantage of the full floating axle over the semi-floating and three-quarter floating types.

Advantages and Disadvantages.

The advantages of the semi-floating type are that the wheel hubs can be made slightly smaller, and because of the location of the bearings the stresses in the rear axle can be kept lower than in the full floating design. There is also a slight advantage in the bearings, as the full-floating type have to use a bearing with a smaller ball, since it must fit around the rear axle tube. In the semi-floating type the bearing has a smaller bore, and, therefore, larger balls can be used, as it has only to go over the axle shaft.

Another advantage is that the rear wheels can be more readily removed when replacements are necessary, for wheels are replaced oftener than shafts.

Still another advantage claimed is that of lubrication; as the outer bearings can be lubricated from the inside and an oil retainer placed on the outside, whilst the full floating type must have separate lubrication for the rear wheel bearings.,

After making adjustments make sure that all locking keys, cotter pins, wires, etc., are replaced and all bolts and cap screws drawn up. Before running a car to try the results of adjustments, all bolts and cap screws must be tightened.

Care in Reassembling.

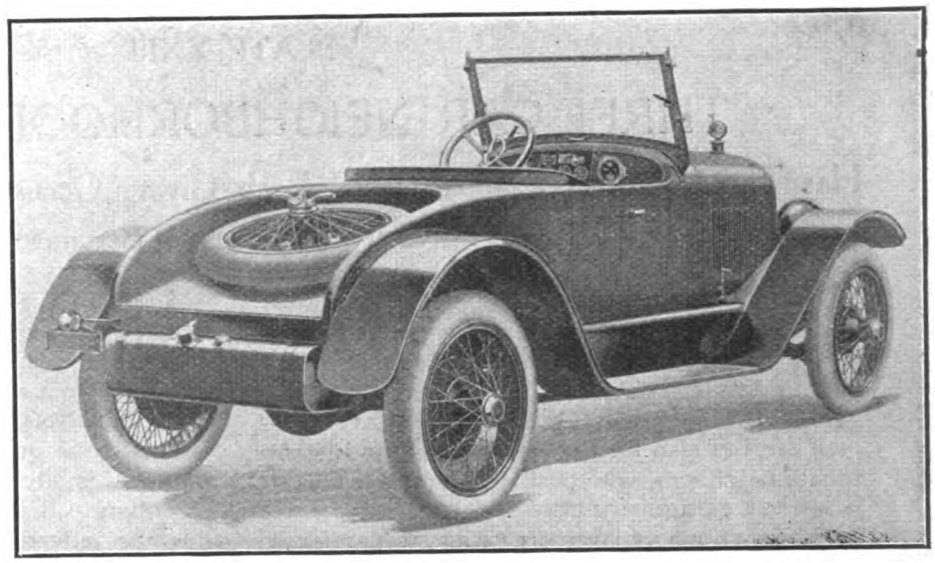
When a rear system has been overhauled and reassembled see that the lubrication is adequate. Usually steam cylinder oil is used. Fill the case to the level plug on the side. This will be sufficient and the oil will not work out at the wheel end.

After the rear axle has received attention the spring bushings should be examined for wear. If either bushings or bolts are found badly worn they should be replaced. Look over the chassis and tighten all loose bolts and nuts. The front axle rarely needs attention, but if there is too much end play take off the hub caps and adjust the bearing cones so the wheels will turn easily without dragging. Fill the caps with grease. This will be forced through the bearings and thoroughly lubricate them.

If when adjusting the wheels a grinding sound is heard in the bearings, take off the wheel. There may be a broken ball, a scored ball race or a worn cone. Replace them with new if this condition is found.

Care of the Steering Gears.

The steering gear and tie rods should receive some attention. The steering wheel is attached to a long tube, the lower end of which carries a double threaded worm or screw, engaging with two half nuts which slide up and down



King Roadster with Open Deck Carrying the Spare Wheel and Tire—Car Is Equipped with Wire Spoke Wheels.

in guides in the steering gear housing. The threads on the steering screw are right and left hand, and one of the half nuts has a right hand thread; the other a left hand thread. When the steering wheel is turned, one of the half nuts rises in its guide while the other is forced downward. At their lower ends the half nuts carry hardened steel thrust blocks which push against rollers attached to the steering yoke, and by their motion the yoke is tilted in the housing, moving the steering arm backwards and forwards, and by the steering connecting rod, turning the front wheels.

The steering screw is provided with a ball thrust bearing and adjustment nut at its upper end to compensate backlash or lost motion in the steering wheel. For best results the steering wheel should have not more than one inch of lost motion at the wheel rim. An oil plug is provided in the steering gear housing and the housing should be kept filled with heavy steam cylinder oil.

The sector bracket which carries the spark and throttle levers on top of the steering wheel is supported by a stationary tube inside the steering tube. The spark and throttle connections are operated by small concentric tubes enclosed in the stationary tube and carrying bevel gears at their lower ends. The Ford car steering gear is somewhat different from the above and is more simple in fact.

The planetary gearset is located at the top of the steering column just below the hub of the wheel. By loosening the set screw and unscrewing the brass cap—after having removed the steering wheel—the gearset may be inspected and replenished with grease. To remove the steering wheel, unscrew the brass nut on the top of post and drive the wheel off the shaft with a block of wood and a hammer. Should there be lost motion, disconnect the two halves of the ball socket fitting the ball arm at the lower end of the steering post and file the surfaces until they fit snugly around the ball. If the ball is badly worn it is best to replace it. Tighten the ball caps at the other end of the steering gear connecting rod in the same manner. If the bolts in the steering spindle arms are loose the brass bushings should be replaced. After the car has been in service two or three years excessive play in the steering gear may necessitate renewal of the gearset pinions, as well as the brass internal gear.

TWIN MUTUAL PLAN OF INSURING AUTOISTS.

Since 1914 the Massachusetts Mutual Automobile Insurance Co. has been furnishing automobile owners of New England with fire, theft and collision insurance at cost. It has paid for several years and is now paying a 25 per cent. dividend at the expiration of all policies. Its associated company, the Automobile Mutual Liability Insurance Co., writes liability and property damage and loss of use policies at the regular stock rates and has always returned a 10 per cent. dividend.

At the April meeting of the directors an increase in the dividend to 15 per cent. was voted. The company now has an arrangement whereby it allows an automobile owner to suspend his policy during the winter when his car is stored instead of obliging him to accept a short rate cancellation. This means a saving of as much as 13½ per cent. of the premium in many cases, and where this saving is possible, with the dividend return of 15 per cent., the net cost of the policy would be better than a 25 per cent. reduction from the rates charged by non-dividend paying companies.

Both companies are in the same office at 40 Central street, Boston, Mass., and are fully equipped to give automobile owners the best possible service in the matter of adjustments, investigations and settlements of claims of all kinds.

The companies are ably managed and are increasing their business each year. The mutual idea of protection at the lowest possible cost is gaining headway and membership in the two companies is increasing greatly.

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PLATE XXIII

THREE-CAR NEIGHBORHOOD GARAGE

Has Three Distinct Compartments, Each Giving Occupant Same Advantages He Would Have If He Occupied Separate Building.

THE question of car housing by the individual, in an individual way, is always of interest to the motorist. Often a far-sighted car owner, having ample room upon his property, builds a garage not only for the accommodation of his own car, but also for the machines of his less fortunate neighbors, who perhaps have no available land for a garage structure.

The man who wishes his garage to pay for its maintenance, and yet have exclusiveness to a satisfying extent, will doubtlessly find that the three-car type illustrated herewith is worthy of consideration. He could use one section for his own car and lease the two others.

The layout is that of a brick structure, comprising three distinct compartments, there being no connections whatsoever. Each compartment gives the same advantages an owner would have if he had an individual garage. The general size is 44 feet four inches long and 26 feet wide.

Each compartment measures 13 feet eight inches in width and 24 feet in length. The sections are separated by eight-inch walls as shown. The ceiling height from floor is 11 feet—one foot higher than the door. Large double doors permit entrance as shown, these being 9 by 10 feet and of the double door swing type.

Provisions for Lighting.

There are windows in both side and rear walls, affording ample light and also giving a fairly good ventilating draft when the compartments get choky from gas fumes. In the floor a drain has been provided, insuring a state of dryness at all times, also permitting the washing of the car.

To the rear of each compartment is a work bench, a sink for general usage and a closet where tools, etc., may be kept. Ample provisions have been made for artificial lighting, which would enable one to work on his car after his day's work is done. A light has been placed directly over the work bench and two lights over the car, so that all parts may be examined under good lighting conditions.

Construction Units.

Foundation: Concrete, at least three feet six inches in depth to enable same to withstand frost ravages. It should be of a mixture fairly rich in nature, the use of a 1-3-5 combination for all mass concrete being advised.

Bed of floor: Should be of the same nature on a cinder fill, having a finish of one inch of granolithic of 1-1 mixture.

Drainage: Should be installed as shown, the floor having pitch toward the center of approximately two inches.

Superstructure, or main building: Brick, on a concrete base, this being the foundation, extended above grade and finished as desired, but the finish is advised to be same as material used for coping. Brick of a rough texture will give the most effective results, using a large white joint, rough struck, flush with bricks. A Flemish bond pattern, with diagonal effect in panels over doors, is suggested.

The inserts have been introduced to give a touch of color and this may be green, blue or white. A lattice treatment is found on the end piers, over which flowers may be grown, enhancing the beauty of the structure.

Tar and Gravel Roof.

The roof is of a tar and gravel composition, laid on boarding supported by roof rafters, which will also serve as ceiling joists. These are spruce, being two by eight inches at the lowest point, increasing to 12 inches, then back to eight in order that the roof may be properly drained, canter boarding also being employed. The flashing should be of the best quality, laid extremely tight, eliminating small leaks of an annoying nature. The drainage is by two conductors of four-inch soil pipe at the rear of the roof, one at either side as shown.

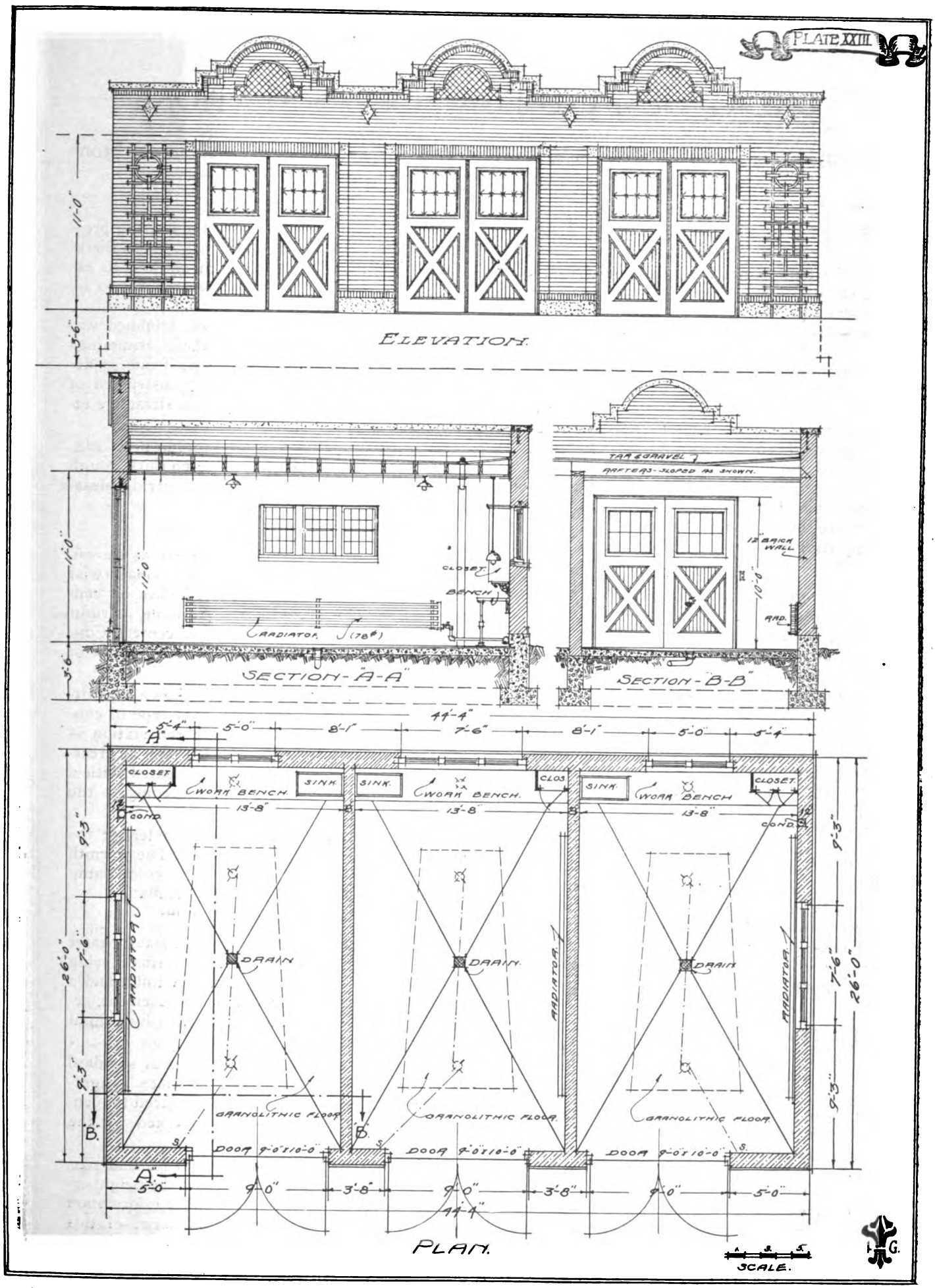
The windows and doors are of wood as shown. There is double hung sash throughout. The sash is 1¾-inch standard make, weighted. The frames are of white pine milled true and finished in a workmanlike manner. All frames and sash to have priming coat at mill.

The doors are paneled, with sash, 2¾-inch stock. Large door frames are cut from 3 by 6-inch plank. The hinges may be from Stanley garage door hardware. Plumbing should be of standard make, with cast iron sinks, with running water, provision being made for a coupling for washing arm for cars. Heating is of wall radiation type as shown, radiators or pipes being placed under windows on outside walls.

Lighting would be as shown, with three outlets, one over the bench and two over the car. Those over the car would be controlled by a switch of the two-way type.

A garage of this type under present conditions would cost from $1200 to $1500. For further details write to the Architectural Department of this publication.

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PLATE XLI.

GREAT DEMAND FOR FILLING STATIONS

Accompanying Design Shows Superstructure of Brick Trimmed with Concrete Stone or Terra Cotta—Effect is Attractive.

FILLING stations have sprung up along lanes of traffic throughout the country, and there is a constant demand for new ones. At these one should be able to obtain oils, greases, gasoline and sundries of a nature that may be needed in emergencies, such as tubes, patches, cement, etc.

As the filling stations depend to a large extent on transient trade, it is advisable to make them as attractive as possible. As individual tastes in this respect may go into extremes, endeavor has been made in the accompanying design to simply illustrate a type.

Many persons think that a mere building with a "gas" pump at the curb makes a filling station complete, but the fact is that the real heart of a filling station is buried beneath the ground.

Units of Station.

In connection with a station, large storage tanks are required for the gasoline and usually there is need for several of them. The prospective dealer is advised to secure tanks of ample capacities, as it may happen that the demand from his customers is greater than the oil companies will be able to supply him on quick orders.

In this respect suggestion is made that a 1000-gallon tank be the average, and that nothing of a capacity of less than 500 gallons be considered.

As all stations must keep adequate supplies of lubricating oils and greases on hand at all times, this stock must be given proper consideration. In the building shown herewith provision has been made for oil storage in vertical tanks, placed in separate compartments as shown, the pumps being located directly over them, as will be seen from a glance at the plan.

Grease, lubricants, etc., may be kept stored below, with some for current use on the shelves of the store or salesroom.

Construction Details.

The foundation would be of concrete, with the main or outside wall at least 12 inches thick, while the interior or dividing wall would be eight inches in thickness. A study of the section at the right will explain fully just what the nature of the construction would be, and of its components.

The mixture for the mass concrete will be found satisfactory, if a 1-3-5 is used, which is a first class quality for foundation work. A footing has been placed underneath the walls to insure equal distribution of all loads and to prevent sinking or sagging caused by excessive weights upon concentrated areas of soil, the bearing pressure of which cannot resist the loads placed thereupon. The foundation has been allowed to extend above grade, forming the base course to receive the superstructure.

The superstructure is of brick, trimmed wih concrete stone or terra cotta, these trimmings comprising cornice and coping, or, if one so desires, the entire building may be constructed of any one of these materials, with an attractive effect being attained.

If brick is used a rough textured one is suggested, with large white joint ¾-inch thick, rough struck or raked out, either of these giving pleasing effects.

Reinforced Concrete Floor.

The floor is of reinforced concrete as shown, using a wire mesh for reinforcing, or small twist bars, the latter being placed six inches on centers, the short span, with rods running at right angles, spaced at about 16 inches on centers. Concrete for all slab work of this nature should be of a 1-2-4 mixture, good and rich.

The roof may be framed up as shown, on rafters if the building laws permit that type of construction in the district where the station is located, and, if not, a concrete slab may be erected. In either case they may be treated with a coating of tar, applying gravel according to the best tar and gravel finishes.

The interior finish may be of plaster, or the walls finished in white, unplastered. The warmth derived from plaster during the cold, damp weather, will well repay for its installation.

Cost of Building.

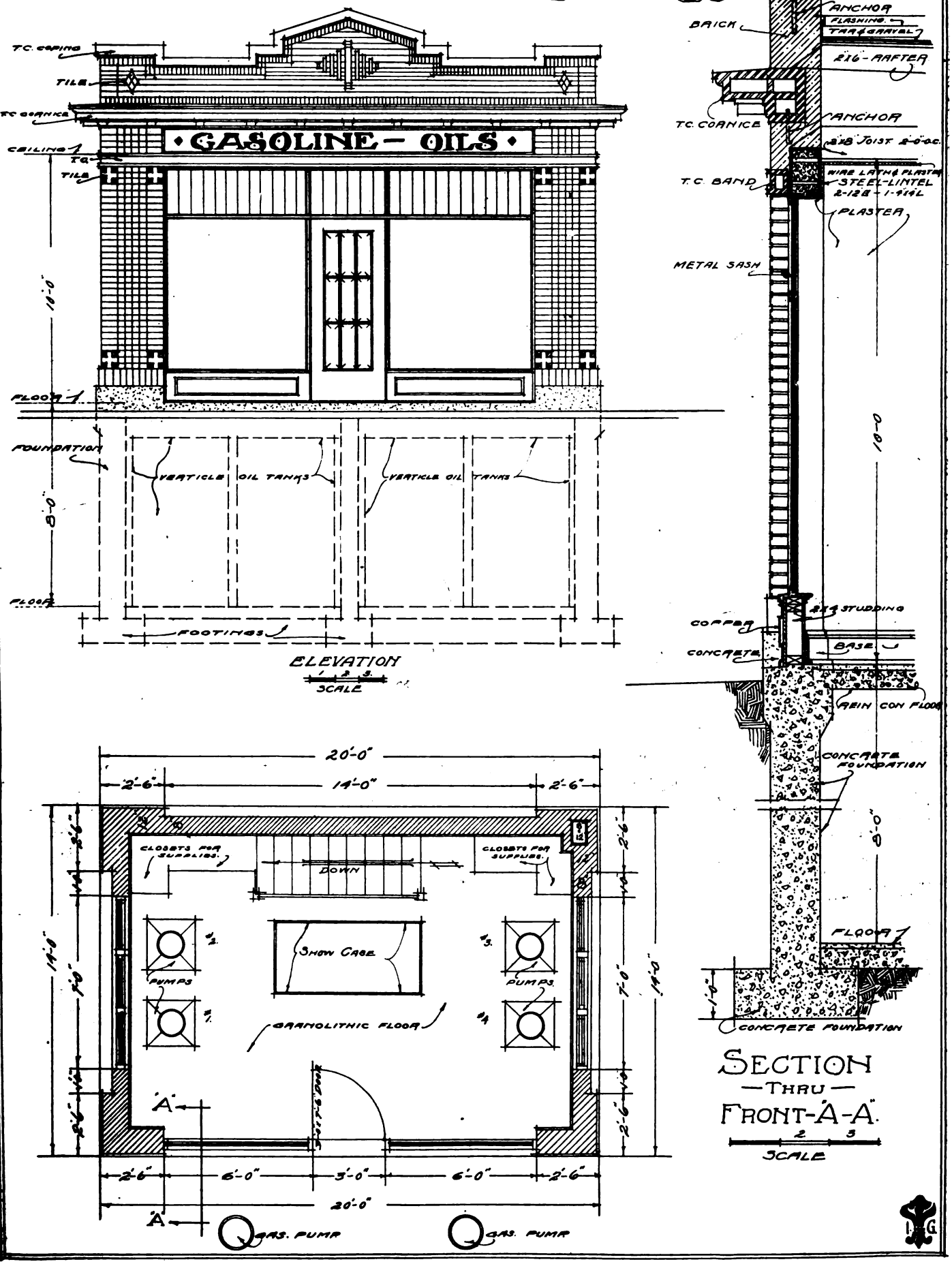
Heating may be obtained from a small heater placed in the basement, a hot air furnace being ample to take care of the same. A toilet and a wash stand are also situated in the basement, access being gained from the upper floor by a flight of stairs as shown.

All plumbing and piping may be of standard make, insuring satisfaction at all times. Lighting by electricity, with the outlets placed to owner's advantage, these being governed by the equipment of the station.

The cost of a building of this type and size, exclusive of fittings, would come in the neighborhood of $1500 to $1800. For further information address the Architectural Department of this publication.

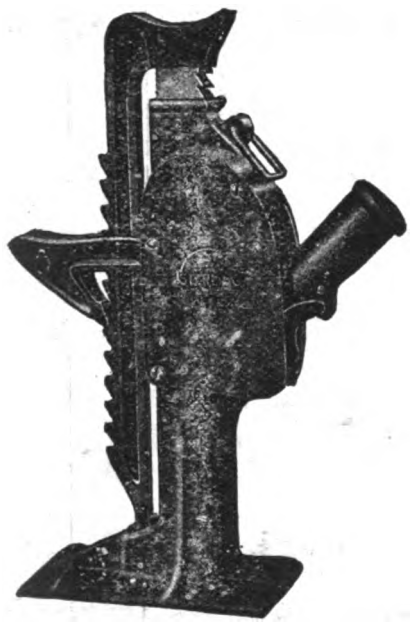
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PLATE XLI



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ACCESSORIES, EQUIPMENT AND TOOLS FOR THE GARAGE AND REPAIR SHOP



"Sterling" Single-acting Jacks. Sterling Jacks are designed for use with every size and type of passenger and commercial vehicle. They are designed for automatic lowering and operate on down stroke of handle regardless of whether the load is raised or lowered. The direction of movement is controlled by upward or downward position of the tripping lever. When handle is not operated the pawls automatically lock, preventing accidental dropping of the load, a quality that insures positive safety in raising any heavy vehicle.

The frames are made of highest grade malleable iron, having a guaranteed tensile strength of 50,000 pounds per square inch; are of liberal proportions and reinforced wherever subject to strains.

The operating mechanism is made of carbon steel and malleable iron, carefully designed to obtain efficiency, safety and ease of operation. All parts are carefully machined, fitted and rigidly inspected. Handles are supplied suitable for each type. The larger sizes are provided with carrying loops for convenience in handling.

Sterling Jacks are guaranteed to give unqualified satisfaction and any jack or part found defective in material or workmanship or unsatisfactory in service will be replaced when returned to the factory for inspection.

Manufactured by the Republic Auto Parts Co., 81-83-85 10th St., Long Island City, N. Y. Prices on application.

Reliable Jacks. These jacks include all sizes from the smallest No. 00, weighing 4½ pounds, that will lift 4000 pounds, to the largest No. 4, weighing 25 pounds, with a lifting capacity of from three to 10 tons. They are suited for use with any machine, from the smallest automobile to the heaviest truck or tractor. They are built with side cranks for placing under axles and taking up slack before the jacks lift the loads.

There are five sizes similar to the illustration. The crank mechanism on the side gear obviates pumping except for actually raising or lowering the load. Turn the crank till the top of the screw is at the required height, slip the jack into place, give the handle a couple of strokes and the car is off the ground. To lower, let the car down by the handle and pull out the jack. This crank mechanism is fully covered by a patent.

The No. 4 jack is for tractor, trolley car, threshing engine use and for work requiring a high jack with great lifting power. It has the crank on the side gear for speedy adjustment. The foot extension and screw shaft are one piece of cold rolled steel shafting 1½ inch diameter.

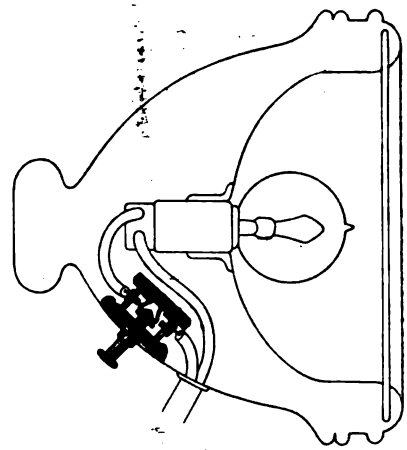


Unconditionally guaranteed. These are standard equipment with some tractors.

Manufactured and sold by the Elite Manufacturing Co., Ashland, O. Price and literature on application.

C-H Spotlight Switch. A new switch recently developed by the Cutler-Hammer Manufacturing Co., consists of the ordinary spotlight with a switch of the push and pull type made for mounting within the shell of the spotlight. Claim is made that many years experience making switches for automobile use have proven that a satisfactory lighting switch must have large "wiping" contact surfaces to prevent excessive contact resistance, and that the contactor must "float" on the operating shaft so that vibration and side strain on the button will not cause the lights to flicker. Both of these qualities are incorporated in this new switch.

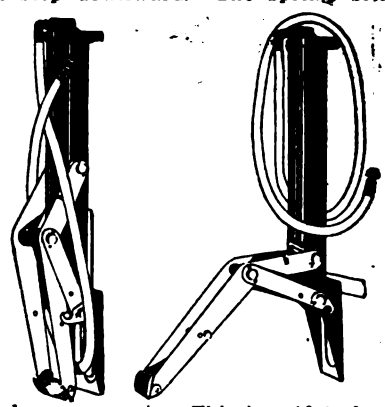
The insulating parts are fiber, the frame of stamped steel, the contacts of brass and the contactor of phosphor bronze. These parts are riveted together to form a solid unit which does not loosen or change alignment when subjected to vibration or strain. The mechanism is not enclosed because this switch is installed inside of



the spotlight shell with the button outside. Either rivets or machine screws can be used to fasten the switch to the shell. No plate is required. Drilling one hole the size of the button and two more for the rivets or screws permits mounting the switch as shown in the accompanying illustration.

Manufactured by the Cutler-Hammer Manufacturing Co., Milwaukee, Wis. Prices and literature on application.

Twombly Tire Foot Pump. A new way of pumping tires is introduced by the Twombly Tire Foot Pump. As is indicated by the name, the pump is designed to be operated by foot pressure, or what amounts to the same thing, the weight of the body. To operate it is only necessary to place the ball of the foot on the lever and step downward. The spring brings



the lever up again. This is said to be essentially a high pressure pump, as the matter of pumping from 70 to 80 pounds pressure is as easy as raising the pressure to 40 pounds. One of the features claimed is its compactness, being only 17 inches long, three inches high and three inches wide.

Manufactured by Schlesinger-Redburn Corporation and marketed by Abbott Motor Equipment Co., Broadway and 59th St., New York City. Price quoted at request.

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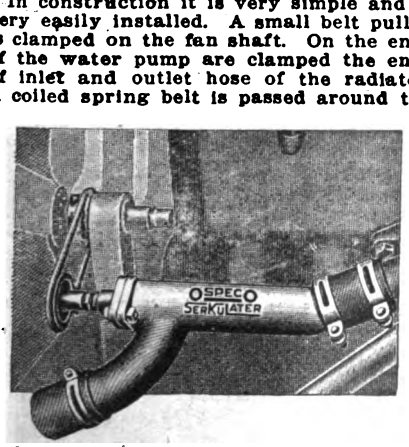
Veedol Products. Veedol products include a full line of oils and greases for all purposes for automobiles, trucks and tractors, and also includes a potash soap for washing cars. The Veedol oils are claimed to be free from sediment after being used a few days. Sediment is caused by the terrific heat of the engine breaking down the ordinary oil, and as a result friction takes place, causing loss of power, increased cost of oil and worn parts. Veedol prevents this formation of sediment because it resists heat. The Faulkner process, used exclusively in the manufacture of Veedol, causes 80 per cent. less sediment. This has been repeatedly proven in scientific and practical tests. Veedol will reduce the upkeep of a car from $50 to $115 a year. Try it the next time you buy motor oil.



Manufactured by the Tide Water Oil Co., Veedol Department, 11 Broadway, New York City. Prices and literature on application.

"Ospeco" Centrifugal Water Pump. The Ospeco Centrifugal Water Pump for Ford cars reduces the heat of the engine by forcing the water from the radiator through the water jacket surrounding the cylinders. This also serves to reduce the oil consumption considerably.

In construction it is very simple and is very easily installed. A small belt pulley is clamped on the fan shaft. On the ends of the water pump are clamped the ends of inlet and outlet hose of the radiator. A coiled spring belt is passed around the pulley on the fan shaft and the adjustable pulley on the water pump propeller shaft which propels a fan-like motor that circulates the water rapidly.



There are no parts to clog or get out of order. A by-pass assures circulation when the engine is not running. It can be installed in a few minutes. This, like other Ospeco products, is fully guaranteed.

Manufactured by the Michigan Auto Products Co., Detroit, Mich., and Cincinnati, O. Descriptive pamphlets of other Ford necessities on application. Price, $5.

Simmons Taper Roller Thrust for Ford Cars. The Simmons Taper Roller Thrust for Ford cars is designed to replace the steel or bronze thrust plate used in Ford rear axles at each side of the differential gearset. Manufacturer claims it is superior to other types of thrust bearings and that because of the longer bearing surface of the rollers it has greater service than ball bearings.



It is not necessary to replace bearings when a pair of Simmons Taper Roller Thrusts have been put into a Ford rear axle.

The construction of these bearings is such that if the differential gearset sags or drops contact is maintained. It cannot be damaged in any position because of the extremely heavy structure of the retainer plate, which is claimed to be eight times as heavy as any used in other types.

Assume 500 pounds actual pressure a thrust plate must take from the gears and add to this when turning a corner, the weight of the car, the weight of the passengers, the side thrust of the car on a wheel, which is taken by the thrust plate on the opposite side of the differential gearset. This, of course, wears the brass and steel plates, causing a variable gear mesh. The necessity for thrust plates on both sides of the differential gearset is seen.

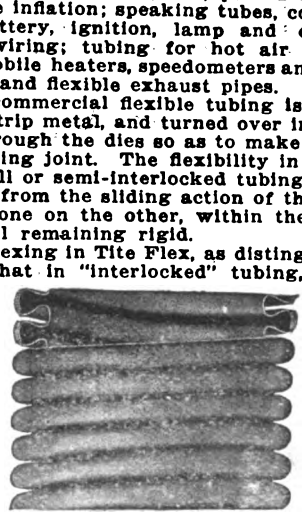
Simmons Taper Roller Thrusts are sold in pairs only. When installed the rear axle is entirely fitted with roller bearings. The bearings carry an unlimited guarantee.

Manufactured by the Simmons Manufacturing Co., 3405-11 Perkins Ave., Cleveland, O. Price, $8 a set.

Tite Flex All-Metal Hose. The Tite Flex Metal Hose Corporation makes gasoline and oil hose for unloading tank cars, filling barrels, garage tanks, etc., in storage and supply stations; gasoline and oil feed lines for gasoline engines; pressure tubes for tire inflation; speaking tubes, conduits for battery, ignition, lamp and electric horn wiring; tubing for hot air stoves, automobile heaters, speedometers and bulb horns, and flexible exhaust pipes.

All commercial flexible tubing is rolled from strip metal, and turned over in passing through the dies so as to make an interlocking joint. The flexibility in ordinary, full or semi-interlocked tubing is obtained from the sliding action of the joint parts, one on the other, within the joint, the coil remaining rigid.

All flexing in Tite Flex, as distinguished from that in "interlocked" tubing, takes

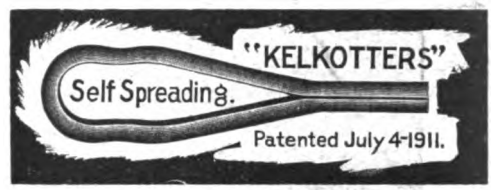


place within annular diaphragms which are substantially at right angles to the axis of the tube and formed by the sides of the U shaped convolutions that are characteristic of the Tite Flex section.

The interlocking portions comprising the seam are compressed under heavy pressure to make a continuous perfect and permanently tight cold welded structure. The seam is to all intents and purposes virtually solid metal. The flexibility is, therefore, entirely in the metal and the seam is primarily self-tight—not "semi-tight" or "near-tight" or depending in any way upon additional provision for tightness.

Manufactured by the Tite Flex Metal Hose Corporation, Newark, N. J. Prices quoted on request.

Kelkotter is the trade name of a new type cotter pin that is guaranteed can be driven into place with a hammer or other tool and the points of the pin will spread themselves. The Kelkotter cannot go into place without spreading equally, dividing the stress upon it. It is always uniform, is easily driven and easily removed by a quick pull and twist on the head. Kelkotters cannot work loose or rattle.



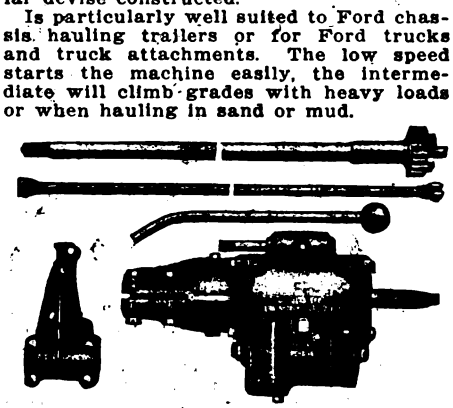
The time and labor saved by Kelkotters justifies their use for every purpose for which a cotter pin will serve. No sharp tools are required to spread and no possibility obtains for marring the work. A demonstration set of Kilkotter pins will be sent on request.

Manufactured by the American Cotter Pin Co., Pittsburgh, Pa.

Moore Transmission for Ford Cars. A Ford equipped with the Moore transmission has four separate and distinct speeds forward and two in reverse. A gearing for every load, road or speed condition that may be met with, economizing fuel, tires and oil.

In actual tests the maker claims the Moore transmission has delivered more power to the rear wheels than any similar devise constructed.

Is particularly well suited to Ford chassis hauling trailers or for Ford trucks and truck attachments. The low speed starts the machine easily, the intermediate will climb grades with heavy loads or when hauling in sand or mud.



The gears are constantly in mesh, much the same as the Ford transmission. With this construction it is impossible to strip gears. Changing of gear ratios is by means of a sliding jaw clutch. The gears are cut from solid steel billets, specially heat treated. The shafts are ground and hardened.

Hyatt roller bearings are used throughout. Lubrication is insured through a hollow shaft. All lower bearings are submerged in an oil bath and oil is carried by revolving gears to the upper bearings. A special oil retainer built into the transmission prevents the oil from getting into the differential housing.

Moore transmissions for Ford cars are in three models. No. 1 is for all Ford cars and chain drive attachments for trucks, rear end type. No. 3 is for all shaft drive truck attachments, such as internal gear rear axles, front end type. No. 4 is for installation on Ford one-ton worm drive trucks only, front end type.

Manufactured by the Tractor Train Co., 1346 Wall St., Los Angeles, Cal. Literature and prices on application.

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Tyler Safety Step Plate is a step plate for automobile running boards that combines a number of desired features. The ribs radiate, having a non-slip surface in every direction. These cannot be torn from the body of the mat by use. The wearing surface is much greater than in most mats of this type, because all of the rubber is above the stiffening plate.

The construction of the plate is much stronger than commonly used. The rubberized cloth backing holds the plate and the rubber together and all are vulcanized as one. On account of this construction it

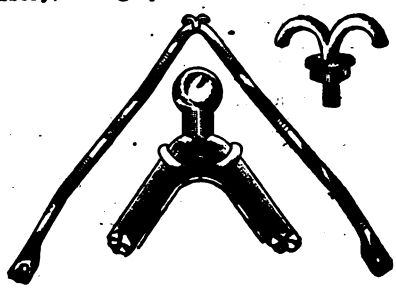


will retain its neat appearance longer and will be more durable. As door mats they are practical. They are themselves neat and clean and all dirt is readily removed from them by brushing or washing.

Manufactured by Tyler Manufacturing Co., 64 Pearl St., Boston, Mass. Prices, type C, all black rubber with steel inside, 8 by 11 inches, each, $1.50. Other sizes from $1 to $3.50.

Perfection Radius Rod Support. This support is made of steel angle iron 1 by 1 by ⅛ inch. It is very strong and will not bend. The eylets are made especially strong where the bolts attach to the axle and they will not break off.

Attention is called to the new twin hook bolts especially designed for this accessory. It grips the radius rod firmly



at the ball socket and the support cannot move forward or backward, and will not rattle. This article consists of only two parts. These are carried in stock and can be quickly shipped. A body brace is also manufactured for connecting the running boards for Ford cars.

Manufactured by the Dow Wire and Iron Works, Inc., Louisville, Ky. Prices on application.

The Woodworth Lubricating Spring Cover is an improved spring cover for leaf springs of automobiles and consists of a water and oil proof material having a felt pad inside, which is saturated with oil before the cover is put on. The cover is adapted to enclose the spring from the clamps at the thick part to the end of the tapered leaves. The cover is held in place with straps about two inches to 2½ inches apart.

These covers afford perfect lubrication throughout the full length of the spring and keep out all moisture and dirt and keep in the oil, so that one oiling lasts for a year or more. Springs perfectly lubricated make the car ride very easy, do not squeak and are not likely to be broken.

The New Woodworth Lubricating Spring Covers are made in special sets for Ford use, which sell at $2.50 a set, and seven



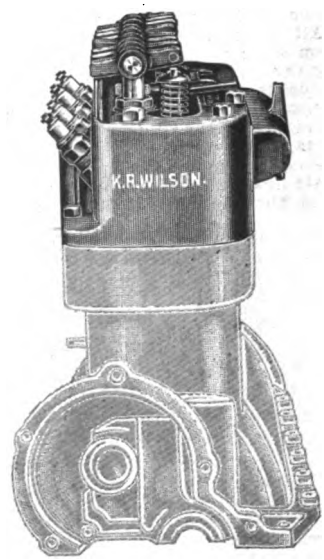
other sizes which fit all other makes of cars. A list of cars showing the sizes of covers required and the prices is published in pamphlet form and in a large two-colored wall hanger, which is furnished free to dealers. The covers are very convenient for dealers to handle, for with only eight sizes any pleasure car on the market can be fitted.

Woodworth Lubricating Spring Covers not only make cars ride easy, but save many times their cost by prolonging the life of tires and machinery. Liberal discounts are allowed jobbers and dealers and free advertising matter is furnished.

Manufactured by the Woodworth Manufacturing Corporation, Niagara Falls, N. Y. Prices and literature on application.

Wilson's Valve-in-Head Cylinder Head is a detachable overhead valve head for Ford engines that is claimed by the manufacturer to be far superior to other types of overhead cylinder heads and to be very economical in operation and to give more speed and power than the ordinary Ford head. The valve area is unusually large, having a port opening of 1⅝ inches and a valve of 1¾ inch. The gas turns just one complete right angle in entering the combustion chamber. The exhaust is on the left side of the engine. The outfit is complete with exhaust pipe and muffler, cylinder head bolts and water connections. The water inlet is in the center of the head, to equalize the cooling, instead of on the end as in the usual construction. The push rods and rocker arms are equipped with fiber tappets to silence the engine.

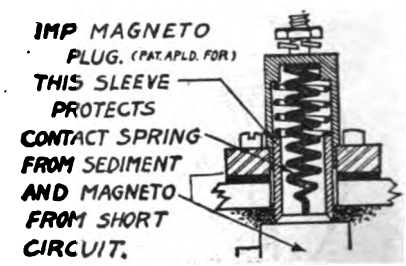
A line of reamers, arbor presses, motor stands, valve seating and facing tools and other tools too numerous to mention are manufactured by this concern for the use of mechanics in overhauling Ford cars.



Manufactured by K. R. Wilson, 10-16 Lock St., Buffalo, N. Y. Prices and literature on application.

Imp Magneto Plug for Ford Cars. Many Ford car owners have experienced difficulty in starting, a condition often caused by fibers worn from the transmission bands being carried by the oil circulation to accumulate around the magneto contact spring. A "short circuit" often results, since it is only necessary to bridge a 3/16 lap between the contact spring and the transmission cover to form an almost perfect electrical connection.

A partial short circuit will reduce the efficiency of the electrical system and loss of power, dim lights and hard cranking



result. It is usually necessary to have a repair man remove the lint, after which the car can be started.

The Imp Magneto Plug has a safety sleeve which protects the contact spring from all foreign substances, making it absolutely impossible for such a condition to develop. It is sold under a positive guarantee that it will insure against all magneto trouble and most all other ignition failures. Since all the current produced by the magneto is delivered to the coil box terminal a hotter spark results, which insures more power. It can be attached by anyone in five minutes.

Manufactured by the Improved Motor Accessories Co., Cleveland, O. Price, $1.50.

Save Your Spokes. Keeps spokes tight in the hub, stops the squeak and saves you money. The moisture which penetrates the dry wood swells it. Then the dry, hot

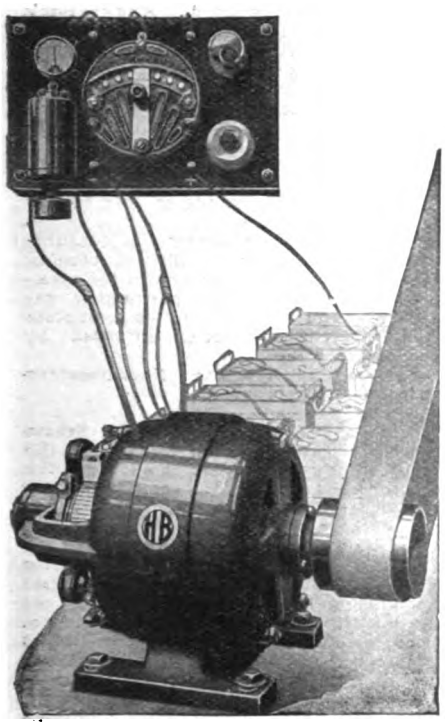


weather drives this moisture out and causes the wood to shrink. This shrinkage and swelling loosens the spokes and every strain makes them rub and squeak. The constant friction between the loose wood parts wears the spokes away eventually. This weakens the wheel until it finally breaks, perhaps on the road, or has to be replaced. Breaking is dangerous, replacement is expensive and using "Save your spokes" it is very easy to prevent both.

"Save Your Spokes" is for use on any patent or artillery type wheels.

Manufactured by the A-C Manufacturing Co., Inc., Chicago, Ill. Distributors' price, retail, 50 cents a can, enough for four wheels. Packed 12 boxes in a fancy show case display.

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The H. B. Belted Charger. An ideal capacity battery charging outfit for the service station and garage that does not have electric current, and use gas engine power, is manufactured by the Hobart Bros. Co. of Troy, O.

The H. B. Belted Charger will charge seven six volt batteries or their equivalent at one time. It operates from a line shaft or engine. Only one actual horsepower is required to operate. The switchboard is furnished complete ready for use with ammeter, pilot light, field rheostat, circuit breaker, necessary fuses and cutouts. This charger is sold on easy terms, which enables the garage man to buy a dependable ample capacity battery charger, letting the profits from each month's business pay for the outfit. The company also manufactures a line of battery charges operating from city current.

Manufactured by the Hobart Brothers Co., Troy, O. Price quoted at request.

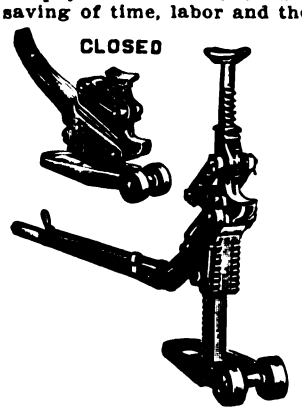
Icy Hot Products is a complete series of Thermos bottles for all purposes and includes a number of innovations such as "carafes" for keeping drinking water three days without ice, for the home or hotel, khaki slings for carrying a hot water bottle on hunting and fishing trips, colored carafe's trays to match for hotel use of several colors and combinations of



carafe and stand with glasses. Icy hot pitcher for the dining room, bedroom or sick room keeps drinking water icy cold, or coffee, tea, etc., hot for days without fire or ice. A novel, convenient and attractive service for afternoon teas, small receptions, etc. Icy hot lunch and beverage cases are for use by automobilists, having carrying capacity of a jar, lunch box and one bottle, or a lunch box and two bottles, or for three bottles. Icy hot auto lunch consists of a complete luncheon outfit in a compact case for the auto. The case is the highest grade of leather craft work. The set includes enameled drinking cups, plates, napkins, knives, forks and spoons for six persons, salt and pepper shakers and two large nickel plated lunch boxes. Icy hot motor restaurant is a dust proof, serviceable auto equipment, made in four and six party sizes. Icy hot lunch boxes for the individual consist of a Thermos bottle and lunch box combined.

Manufactured by the Icy Hot Bottle Co., Cincinnati, O. Prices and circular on application.

Excel Auto Jack. A heavy tool constructed to endure the continuous hard usage of the garage and service station and meets the demand for a powerful, substantially built, quick acting jack. It is made of high grade malleable castings—drop forgings where necessary—with all wearing parts hardened. It will last for years under the most severe conditions. It pays for itself over and over by the saving of time, labor and the usual

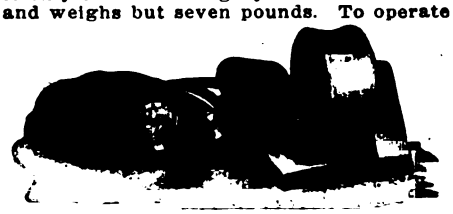


breakage of small jacks which have little value except for emergency road work.

The Excel Jack is too large to be misplaced, is positive in action; it can be placed under the hub, axle or frame very easily and it always works. Excel Jacks are indispensable in public garages, service stations, repair shops, tire agencies, race track pits, and are frequently used in private garages.

Manufactured by the Randall-Faichney Co., Inc., 76 Atherton St, Jamaica Plain, Boston, Mass. Price $25 (subject to change without notice).

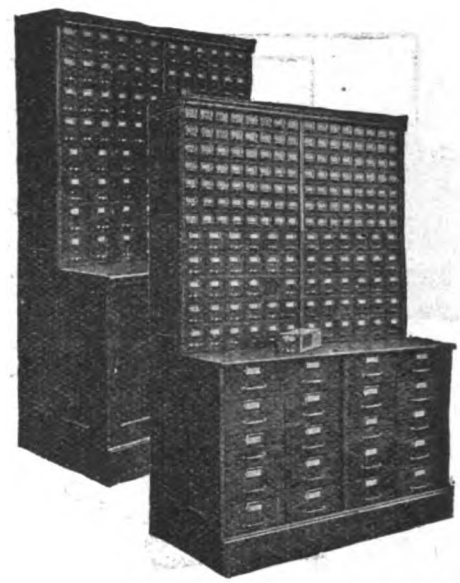
The S-H Tire Pump. Designed with the intention of eliminating tire inflation trouble, the S-H Tire Pump should prove a boon to the motorist. This little pump is only 10 inches long by four inches wide and weighs but seven pounds. To operate



it is only necessary to jack up one of the rear wheels, place the friction wheel of the pump under the tire, start the engine and a steady flow of air for tire inflation is furnished. The equipment consists of the pump, a tire gauge and a long, flexible air hose.

Manufactured by the S-H Pump Co., Chicago, Ill. Price complete, $8.

Steven's Service Cabinets. Nothing leaves such a lasting and favorable impression upon the accessory buyer as quick service, in fact, service may well be said to be the key to success. To facilitate service, accessories and parts must be conveniently located and kept in order. Many sales are lost because the dealer has forgotten where the part in question was



located. To systematize the parts stock the Stevens service cabinets have been designed. Practically any combination of units may be assembled so that the dealer has a place for every part.

The cabinets illustrated show two possible and useful combinations of Stevens' units. The combination in the front is made up of three units and a top. The top units contain 172 small and medium sized drawers, which will hold small stock parts and bolts. The lower is fitted with 20 large sized drawers, which are suitable for larger and heavier parts, accessories or tools.

The combination in the rear is made up of three units, the two upper being the same as those in front. The lower section is fitted with doors and a shelf upon which may be stacked larger and heavier parts, such as cylinders, crankshafts or transmission parts.

All of the drawers are covered with heavy galvanized steel and may be fitted with compartments and cross divisions as desired.

Manufactured by Stevens & Co., 375 Broadway, New York. Price quoted at request.

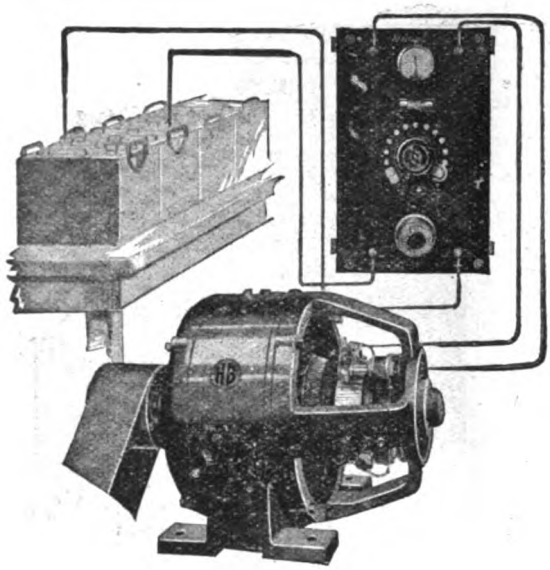
Portable Grease Cabinet. A very convenient cabinet for use by garages, manufacturers, service stations and car owners is being marketed. The container has capacity for 20 pounds and delivers one



quarter pound to each stroke of the pump and passes nothing but grease or fluid. The shipping weight, including pump and five feet of hose with nozzle attached is 14 pounds.

Made by the Townsan Auto Specialty Co., 822 Western Ave., Minneapolis, Minn. Price quoted at request.

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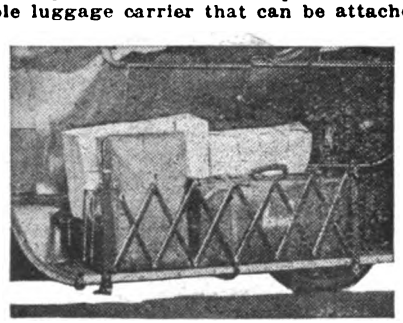
HB Lighting and Battery Charging Set. With the HB Lighting and Battery Charging set, the garage that does not have electric current available from any public plant can make its own electric light and at the same time have the power necessary to handle the profitable business of recharging automobile storage batteries. The generator is a specially wound machine, 110 volts, direct current, speed 1800 revolutions per minute, weight 300 pounds. It operates from line shaft or engine, requiring four horsepower at full load. It supplies ample capacity for brilliant lights at low cost, and it will recharge at one time from one to six six-volt auto storage batteries or their equivalent.

Since brilliant lights attract trade and improve service, and since battery charging is developing into such a profitable business, this outfit should be warmly received by the garage trade for which it is intended.

The HB Lighting and Battery Charging set is furnished complete in every respect, ready to belt to engine and operate. It includes generator, base tracks, field rheostats, charging panel and pulley with six-inch diameter and four-inch face. No switchboard is necessary.

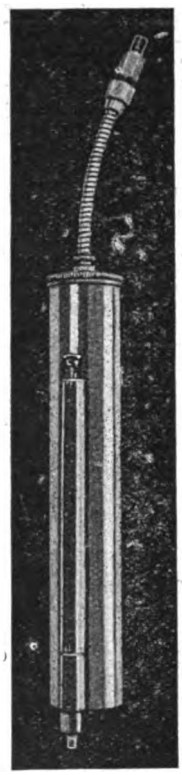
Made and sold by Hobart Brothers Co., Troy, O. Prices on application.

Standley Carrier. The "Standley Carrier" is a convenient and quick detachable luggage carrier that can be attached



to the edge of a running board by clamps, forming a basket for carrying luggage of all kinds. The clamps are provided with lock nuts that securely fasten them so that they cannot work loose. When not in use the carrier may be folded and stowed under the seat. It is provided with a strap to hold parcel and luggage away from the body. It is adjustable to any length from 10 to 44 inches. It is a very handy article for use by hunters, campers and fishing parties or traveling men. In construction it is simple, strong and efficient and takes only a moment to install.

Manufactured by the Standley Skid Chain Co., Boone, Ia. Price, $4.



Atlantic Pneumatic Grease Gun. This new grease gun is a brass cylinder one foot long and two inches diameter that will hold 16 ounces of grease. It is operated by air pressure through a tube connecting the gun with either a power or foot pump or with a spare tire or a compressed air system. The gun is operated by pressing a button on the gun with the thumb of the hand holding it. Some owners use oil in preference to grease as it is difficult to use hard grease, but oil has the disadvantage of collecting dust and dirt.

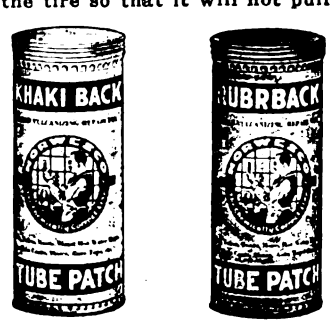
By using the power gun hard grease may be forced into joints with force that will expel the remaining lubricant and replenish the supplies.

The volume of air necessary to operate the gun to grease a car is small; if drawn from a spare tire would probably not reduce its pressure two pounds.

The gun can be held and operated with one hand and the other hand is free to open and close the grease cups. Other guns require both hands to operate them. All parts are well machined and the gun is nickel plated. A unique filler and one nozzle are furnished with each gun. Extra nozzles are supplied at additional cost.

Manufactured by the Atlantic Motor and Supply Co., 1045 Tremont Building, Boston, Mass. Price, $6.

Rubrback and Khaki Back Patches. Two self-vulcanizing tube patches have been added to the Norwesco "Chemically Correct" series of automotive utilities. Rubrback Tube Patch is manufactured from highest grade materials and under a special process that insures a perfect repair. This patch is designed for repairing both punctures and blow outs and expands with the tire so that it will not pull loose



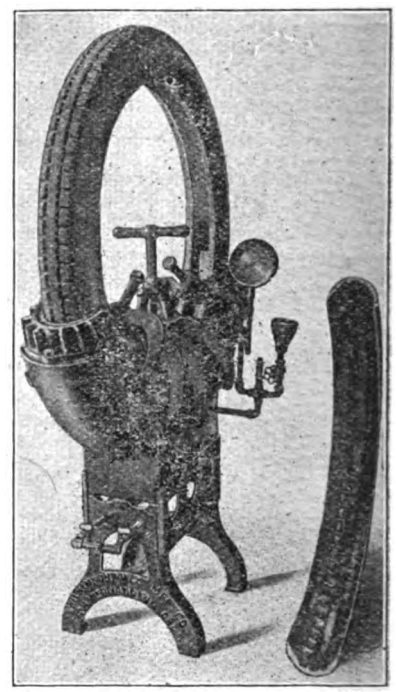
when the tire is inflated. Khaki Back Tube Patch is made from the same quality of materials as Rubrback, except that it is reinforced by a covering of khaki cloth. This patch is especially effective where a non-stretching repair is necessary.

These patches are effective under extreme heat or cold, and can be applied either in the owner's garage or as an emergency on the road. They are as efficient for all articles made of soft rubber as for automobile tubes.

They are packed in screw top containers, two sizes. Each outfit containing sufficient cement and emery cloth for making numerous hasty and permanent repairs. No motorist's outfit is complete without the tire protection afforded by these Norwesco Patches.

Manufactured by the Northwestern Chemical Co., Marietta, O.

Wilkinson Perfected New Model Steam Vulcanizer. This machine represents the latest development in the Wilkinson dry cure process and has the new non-skid matrix, which, it is anticipated, will revolutionize the tire industry. With its use the tire man is able to rebuild an old casing into an apparently new tire, adding from 2000 to 5000 miles at a very nominal cost. This machine is equipped with all of the latest Wilkinson patented features, such as the aluminum non-skid or ribbed tread matrix and the radiating insulated flange to protect the tire from overcuring at the laps. The machine requires no separate boiler, as it has a boiler self contained and is also equipped with steam safety valve and gauge.



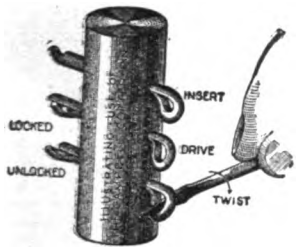
Tire experts all over the United States have passed upon the Wilkinson process and declare it to be as near perfect as can be made. Racing car drivers are using dry cure retreads with much success, while owners of passenger vehicles and small trucks are cutting down tire expense by restoring shoes that have not been structurally damaged though the original treads were worn to the breaker strip. Wilkinson equipment is now installed in many large repair shops in the East and Middle West and is very generally used on the Pacific coast, where automobile touring is at maximum. The Wilkinson organization is now negotiating with large concerns all over the country to handle this equipment in various zones and is tripling the capacity of its plant to care for the demand.

Manufactured by Wilkinson Vulcanizer Manufacturing Co., San Bernardino, Cal. Prices, models H, K and L sell for $159, $188 and $198 respectively.

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Campbell Hammerlock Self-Spreading Cotter Pin. The Campbell Self-Spreading Cotter Pin is economical and practical, and is especially adapted for quick repairs on automobiles. All operations being done from the eye end, the pin may be easily locked in places where points are inaccessible to spread in the manner necessary with the old type. All points are close together and well tapered. Pliers are unnecessary.

To lock, merely drive on the head until the points are of equal length. This will partially flatten the eye and will force the shorter or straight branch forward so that its end will ride up over the un-



turned point of the other limb, thus automatically spreading as well as locking the pin rigidly in place.

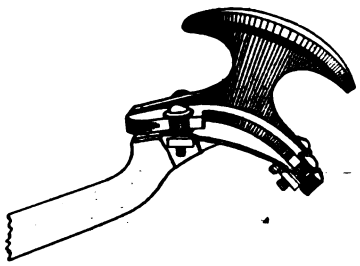
To remove, use point of screw driver, the tang of a file, a key, or any thin tool in the eye, twisting to return the short shank to its original position. Then remove with the fingers.

In addition to being used with its self-spreading feature, the Campbell Hammerlock Self-Spreading Cotter Pin may also be used in the same manner as the ordinary cotter pin. When so used, it is much easier to spread than the ordinary pin because one point extends beyond the other.

The pins may be used over and over again.

Manufactured only by American Chain Co., Bridgeport, Conn. Prices quoted on request.

Easy Back Pedal for Fords. This is an extension for reverse pedals that is designed to make backing of Ford cars easier and safer. It serves as a foot guide when driving at night or in heavy traffic, and does not interfere with the use of the regular pedals. It is made of iron

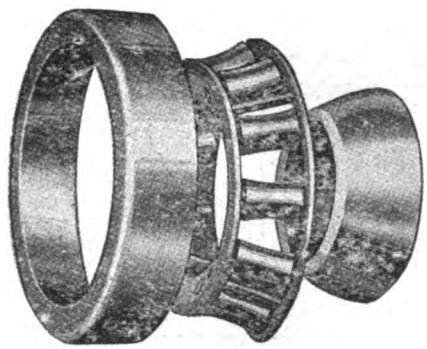


and is indestructible. The device is especially helpful to women drivers. It can be attached in a few minutes. The only tool needed is a screw driver, there being no drilling or special work to be done. It is held in place with four bolts and two clamps, which are furnished with each pedal.

Manufactured by Ellis-Smith Manufacturing Co., Inc., Elmira, N. Y. Price, 75 cents.

Shafer Roller Bearing. Departing from the usual type of roller bearing design, the Geo. D. Bailey Co., maker of the Bailey Ball Thrust Bearing, has placed on the market a front wheel bearing for Ford and Chevrolet 490's under the name Shafer Roller Bearing, designed to eliminate the chief source of front wheel bearing trouble, namely, the inability to take a heavy thrust (sideway) load without damage to the bearing and take care of axle spindle deflection as well.

The outer surface of the inner cone is



convex, having the contour of a perfect ball, and the rollers possess a concave surface, thereby forming a cradle as it were for the cone and allowing it to swing to meet any deflection of the spindle when it gets out of alignment. The cone being free to move with the spindle and the load being taken upon the full length of the rollers causes no strain or binding of bearing itself as in the case of the rollers of a bearing the cone of which is held perfectly rigid and cannot meet the misalignment or deflection of spindle.

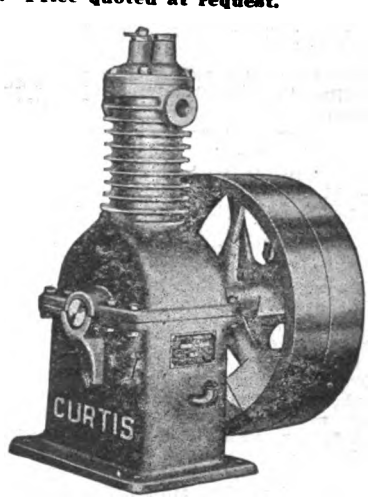
The concave surfaces of the rollers at all times present equal load carrying surfaces both from the side as well as the top and therefore the bearing is able to carry thrust (sideway) loads equally as well as radial (downward) loads. This feature in itself is a distinct departure and, it is claimed, permanently stops the real source of front wheel bearing trouble.

Nothing but the highest grade chrome nickel alloy steel is used throughout. This fact, coupled with three years of most severe road and breakdown tests, enables the maker to guarantee every Shafer bearing without reservations.

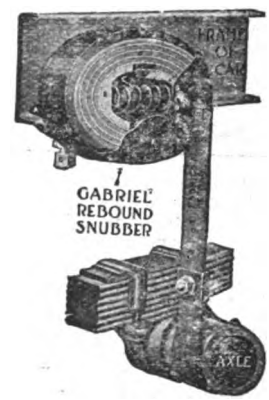
Manufactured by the Geo. D. Bailey Co., 1120 South Michigan Ave., Chicago. Prices quoted on request.

The Curtis Air Compressors for garages and service stations are said to possess exclusive features of unquestioned merit and are guaranteed by the manufacturers who have manufactured pnuematic machinery for over 25 years to furnish a continuous supply of cool, pure, clean air, free from oil. In the Curtis compressors the oil leakage into the cylinder has been overcome by their patented control splash oil system, which regulates the oil supply, permitting only enough oil to reach the cylinder to lubricate it without leaving any excess that can be carried into the discharge line. The result is that practically no oil can get into the tires to rot them and it is claimed that the compressor will run on one-tenth the amount of oil ordinarily required by a splash oil compressor. Handled through the jobbing trade exclusively.

Manufactured by Curtis Pneumatic Machinery Co., 1621 Kienlen Ave., St. Louis, Mo. Price quoted at request.



Gabriel Snubber. No car is considered up to date without some form of shock absorber, either as an accessory or incorporated in the design. The Gabriel Snubber is an accessory shock absorber which is designed to protect the car by the elimination of vibration, to prolong the life of tires by keeping the wheels on the ground and giving traction. They are easily applied upon practically any car now on the market. When ordering mention the name, model and year of car.



Manufactured by Gabriel Manufacturing Co., Cleveland, O. Distributed in New England by W. J. Connell Co., 171 Massachusetts Ave., Boston, Mass. Price quoted at request.

Oilzum. The Oilzum motor oils and lubricants include a light bodied oil, particularly suitable for water cooled engines having close fitting pistons; a medium bodied oil, adapted for high speed V type engines; a heavy bodied oil, which may be used the year around and relied upon to flow in the coldest weather; a very heavy bodied oil, used principally for racing and suitable only for engines having great piston clearance; a smooth, heavy bodied dark oil for the lubrication of transmission and differential gears, also suitable for front gears if the cases are tight and separate from crank case; a high-pressure super-heated steam cylinder oil, compounded especially for steam cars; a semi-solid oil, which does not drip and waste like fluid oils, for lubricating sliding gear and planetary transmissions.

The Oilzum line also includes a smooth mineral grease for packing axles, ball and roller bearings, steering gears, universal

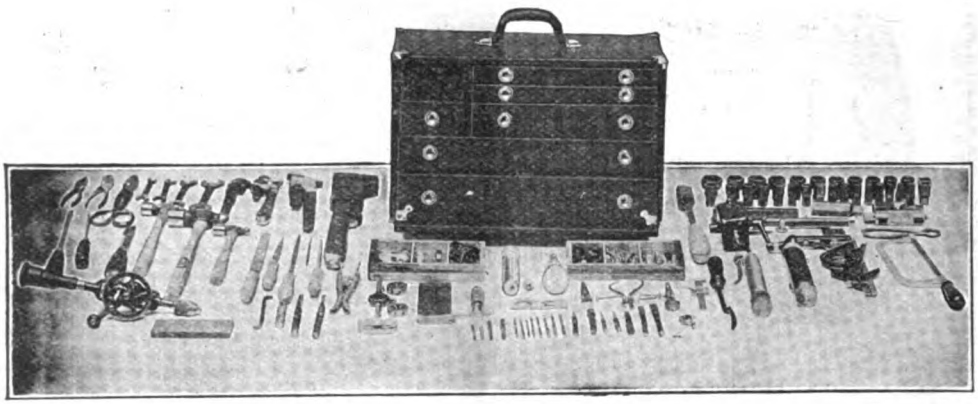


joints and for all compression cups; a finely ground graphite and pure mineral grease for lubricating chains, brakes and circulating pumps, and which is not affected by contact with water, also used for packing axles, ball and roller bearings, steering gears, universal joints and for all compression cups; a very adhesive, stringy mineral grease of a particularly clinging nature for packing differential gears and transmissions, especially adapted for lubricating differentials and transmissions which are worn and noisy; a gear lubricant which is a successful quieter for timing gears.

Other products include Oil Soap, for cleaning varnished and painted surfaces, and Cleanzum, a hand cleaner.

Manufactured by the White & Bagley Co., Worcester, Mass. Write for literature and prices.

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"Union" Garage Chest for Auto and Truck Mechanics and Owners. In addition to its great capacity, the "Union" Garage Chest is conveniently arranged, as the two small top drawers are fitted with moveable partitions for small parts and for delicate instruments such as battery gauges, etc.

The third long drawer from the top is designed to hold a complete set of socket wrenches of any make, while the last drawer becomes a till when removed from its place in the chest and which may be carried about the garage by means of a telescoping handle.

The frame is of thoroughly seasoned, properly kiln dried, selected oak. The frames are lock cornered and glued, making the strongest possible corner joints. The backs of the chests are rabbited or shouldered to the frame, as well as glued and nailed. The frame of a Union does not weaken or loosen.

The bottom compartment is a tray made of solid oak throughout, fitted with a handle which drops down into the drawer when not in use. The tray corners are lock cornered and the bottom is protected by metal corners.

In the drawers the sides are of hard wood. The front is of selected oak, the bottoms thick three-ply veneer. Two small drawers are fitted with moving partitions. One long drawer is partitioned to hold a socket wrench set. The drawers are extra long, but light. The fronts are locked to the sides with double lock joints. The three-ply veneer bottom is tongued to the sides and fronts, making it much stronger and better than a thin solid bottom.

In the drawer pull the Union's own design of flush ring pulls save space and only the use of a finger is needed to open a drawer. The ring is flush with the drawer front and cannot pull off.

The drawers run on slides, these slides being made of hard wood and inset in the sides of the case. They will bear any weight.

The handle is covered with heavy, genuine leather, and has heavy steel wire through the center. The loops, secured by rivets (not screws) carry weight and cover the ends of the handle, which is attached to the chest with heavy cotter pins, preventing its being pulled out of the loops.

The hardware is extra heavy with polished nickel finish. The lock is a Sargent & Greenleaf, 100-key change, solid brass and bronze, with two, milled slot, flat, rust proof keys.

The outside finish is filled, stained, shellaced and varnished. The color is glossy black, which will not show finger marks and may be easily cleaned. The finish is oil and water proof. The entire inside of the frame and each drawer is finished with an oil proof and water proof preparation.

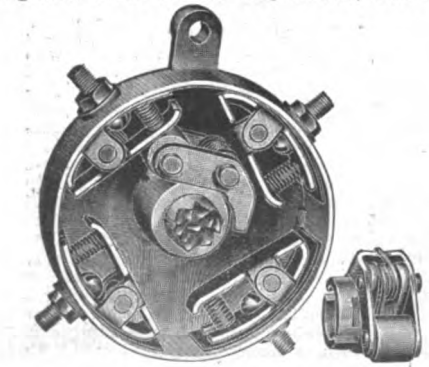
The outside dimensions are: Length, 20¼; width, 9¼; height, 13¼, and approximate weight is 23 pounds.

Manufactured by Union Tool Chest Co., Inc., Rochester, N. Y. Price, $14.25.

Bay State Commercial Timer for Ford Cars. The Bay State Pump Co., in introducing the Bay State Timer, states: "In presenting the Bay State Timer to the public we do so with complete knowledge of the troubles that have heretofore been experienced with other timers for Ford cars, and with the belief that we have entirely eliminated those troubles.

"It is unnecessary to go into minute details as to the whys and wherefores of the defects of timers of the past, as every repair man who has had experience with Ford cars knows where the trouble lies.

"The cut shows at a glance all construction. Note the contact and brush. Steel against steel all the way round, and all



these parts hard as glass. Hardly necessary to say that they will wear longer and more even than steel against fiber.

"Remember what the arcing or burning of the current does to the contact track in the regular type. In the Bay State Timer the arcing occurs at the bent ends of the contact—where it can do no harm. No fiber or soft steel contacts here to burn and get humpy.

"In this timer complete resilience of contact is obtained by making both the brush and the contact yielding. This construction results in smooth, even, quiet action, and in perfect adaptability to any possible eccentricity of the timer shaft—a feature of utmost importance.

"There are no humps and no hollows in this timer after thousands of miles of running."

Manufactured by the Bay State Pump Co., 100 Purchase St., Boston. Price quoted on request.

Monogram Oil. De Palma driving the Packard Twin-Six with which he smashed the world speed record used Monogram Oil. The New York Lubricating Oil Co., maker of the Monogram products, also takes pride in the fact that a great number of famous races were won by drivers who pinned their faith in Monogram for the lubrication of their machines.

The Monogram products are backed by a strong service. Tables have been prepared to show what grades of Monogram oils should be used on various models of automobiles. The products include light grades, medium, heavy, extra heavy, Knight Motor, Non Liquid and Transmission oils.

The company points out that some garages fail to handle Monogram oils and greases because they are not satisfied with a fair profit, but prefer to sell inferior products that will give them an unreasonably large margin of profit.



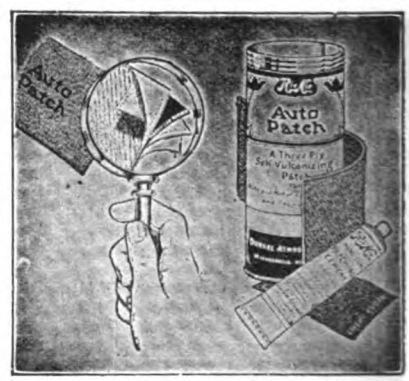
Monogram Steel Drums are manufactured in 15, 30 and 55-gallon sizes, and are very convenient containers. Each drum is fitted with an easy turning faucet, permitting a person to draw the exact amount of oil required.



The maker of Monogram manufactures "a scientifically prepared lubricant for every purpose."

Made by the New York Lubricating Co., New York City. Branches in principal cities. Prices on request.

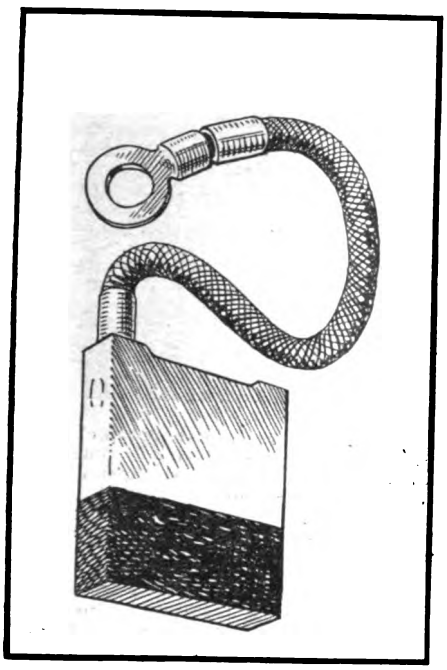
Rie Nie Auto Patch. Something new in the way of tire patches is being marketed under the trade name Rie Nie Auto Patch. This patch is made up in a special way. A layer of cured rubber is placed between two layers of especially prepared raw rubber. One side is covered by a layer of fabric which adds to the



strength and wearing qualities of the patch. This construction makes a four-ply patch, which may be applied without the use of special tools or heat. This patch is covered by a broad guarantee by the manufacturer, who says that the smallest puncture or the largest blowout may be mended satisfactorily.

Manufactured by Durkee Atwood Co., Minneapolis, Minn. Price for small size (36 square inches), 50 cents each; for large size (108 square inches), $1.

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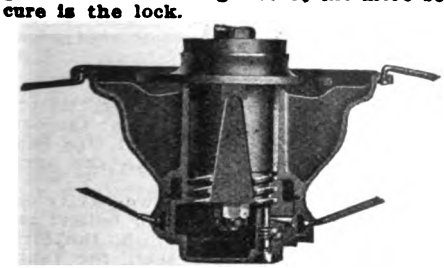
Brushes for Automobile Starting Motors and Lighting Generators. Too much care cannot be exercised in the selection of brushes for electric starting and lighting systems, for many of the troubles experienced by car owners are due to the use of the wrong grade of brush on the starter or generator.

In Ohio carbon products the composition of each type of brush has been determined only after tireless scientific research and thorough tests, both in the laboratory and actual service.

The replace brush business is growing by leaps and bounds. The Ohio Carbon Co. carries a complete stock of starting and lighting brushes at all times, assuring prompt service. The company has recently issued a car list and price sheet. The accompanying illustration is for the Simms-Huff motor generator. It is metal-graphite, ¾ by ⅝ by ¼ inch, top slot, cotton covered pigtail with ring terminal, used on Maxwell cars.

Manufactured by the Ohio Carbon Co., Cleveland, O. Write for car list and price sheet.

Kol-Ben, the Double Locked Wire Wheel. The illustration shows a sectional view of the Kol-Ben indestructible hub with the double-locking feature. One lock locks the other. All locking parts are chrome nickel steel, heat treated and hardened. Because of exceptional factor of safety this hub will resist the hardest use that can be made of it. The Kol-Ben wheel cannot run off or back off. The greater the centrifugal force the more secure is the lock.



Kol-Ben wheels are demountable. There are five to the set. One wheel, with its inflated tire ready for emergency, is carried as a spare. The complete change of wheels, in event of a puncture or blow-out, is made in remarkably short time.

There is an absence of lugs, nuts, bolts and other loose parts. In the Kol-Ben wheel the movable parts are used only for locking and unlocking. Grease chambers are so designed and carefully packed with grease before leaving the factory that no matter how seldom the wheel is removed those moving parts are always well lubricated.

Great care is taken in the finishing process. The Kol-Ben enameling is done by special and elaborate equipment.

Manufactured by the Kol-Ben Wheel Co., Inc., Detroit, Mich. Prices quoted on

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McGregor Bumpers. The McGregor series of automobile bumpers is intended to equip all makes of cars. The bumpers are made of strong and durable spring steel, are built for strength and service and are sold at comparatively low cost. The non-interfering splash pan attachment is a feature.

One of the series, the Combination Spring Bumper, is equipped with an all-spring steel arm, applicable to all cars with extended frame, both front and rear. The New McGregor Diamond Bar Bumper is adaptable to cars with or without splash pans. The design is attractive. The bumper can be quickly attached, no drilling of holes being necessary. McGregor's Special Rear End Bumpers give good service.

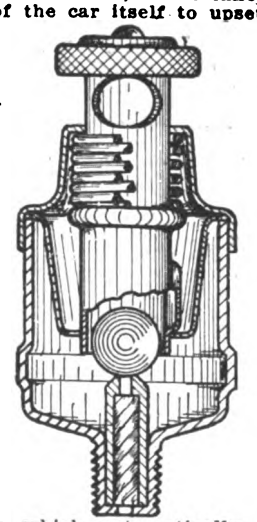
The accompanying illustration is that of Nos. 17-18. Nos. 10, 11, 12, 14, 15, 16, 17 and 18 carry the same design of arms, or



fittings, the only difference being in the bars. McGregor's New No. 2 Bumper for Ford cars has universal fittings. It will fit any type of Ford and sells from $6 to $9.50. McGregor Special Bumpers are priced from $7.50 to $10; the Combination Spring Bumpers are $8 and $9; the New McGregor Diamond Bar Bumper, $10 to $12.50. Prices of other bumpers will be quoted on request.

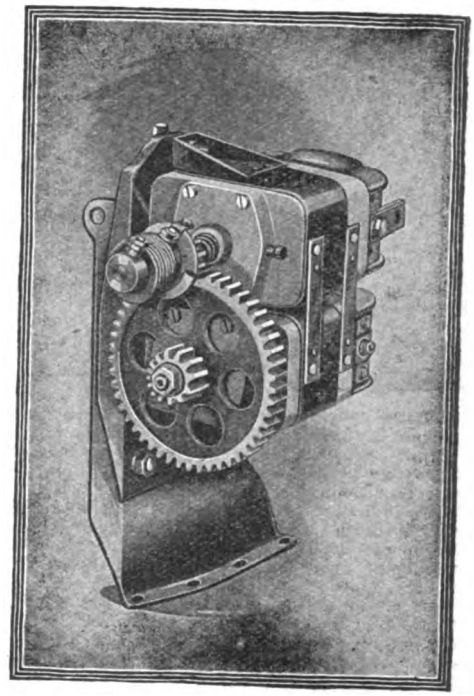
Manufactured by the U. S. Auto Bumper Co., 115 East 30th St., Chicago. Write for literature.

The Consol Automatic Oiler, which is automatic in operation and dirt proof, has many distinct features, fully protected by patents not heretofore used in any oiler. It is neatly made and comes in several styles and finishes. It absolutely prevents leakage of oil onto the bearing when the car is not in motion, for it takes the vibration of the car itself to upset a little



ball valve which automatically controls the flow of oil from the cup. Already several automobile manufacturers have placed orders for these oilers, recognizing in same a distinct improvement over other oilers. The company is just starting the production on a large scale.

Manufactured by the Consolidated Machine Co., Detroit, Mich. Price quoted at request.



Gray & Davis Starting-Lighting System for Ford Cars. The double-unit system consists of a self-regulating dynamo, starting motor, battery and battery box, lighting and starting switches, sprockets, chain and wiring—in fact, all items necessary to make installation.

The dynamo is driven from a sprocket on the crankshaft by a silent chain of liberal width. It charges the battery automatically. The cutout keeps the circuit between dynamo and battery closed above eight or 10 miles an hour, and automatically opens the circuit when the speed drops below this average. The dynamo, through its inherent regulation, delivers a uniform current.

Located above the dynamo is the starting motor. Its meshing feature is unique. When the starting pedal is pressed the motor turns; the pinion or small gear automatically moves along the motor shaft until fully engaged with the dynamo gear when the motor cranks the engine. As the engine starts the dynamo gear is turned faster and automatically spins the pinion along the threaded shaft out of engagement.

The system is so simplified that there is practically nothing to get out of order. Both units are substantially constructed; the frames are forged from special dynamo steel. The end, or bearing brackets, are electrically welded to the frame.

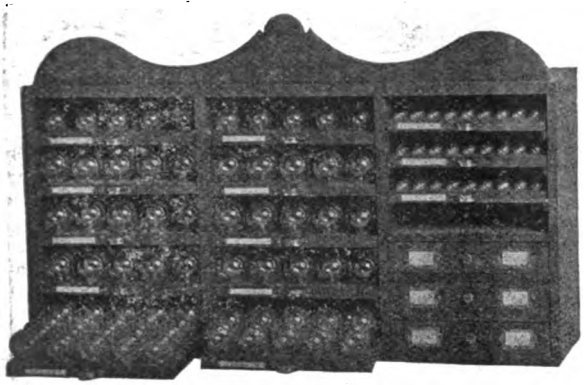
The battery is of the six-volt type, especially designed for starting and lighting service. It is carried in an enameled steel box. It supplies current for cranking the engine, and for lamps at low car speed, as well as when the engine is at rest. The battery is automatically recharged by the dynamo when car is running.

The lighting switch, conveniently located on the cowl in front of the driver, controls the head, side and rear lamps, and also provides for dimming them. The starting switch is placed under the heel board, with the pedal projecting through it. A slight pressure on pedal causes the motor to crank the engine.

All wires and cables are cut to proper length and supplied with supporting clips and terminals to facilitate a neat installation. The only part removed from the engine to make installation is the pulley on the crank shaft (replaced by a sprocket). The starting crank may remain in its normal position if desired.

Distributed by Lalime & Partridge, Inc., 616 Commonwealth avenue, Boston. Write for literature and prices.

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Miller Brothers Electric Bulb, Fuse and Brush Cabinet. This is for automobile supply dealers, electric supply dealers, hardware dealers and garages. The cabinet has been designed with a view of a more efficient and convenient method by which bulbs, fuses and brushes, etc., can be properly displayed and handled with the least possible chance of breakage by falling from loose, cheap cartons.

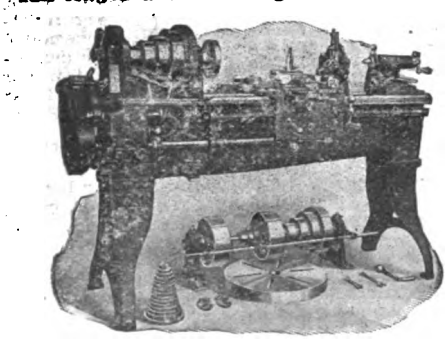
It meets a long looked for arrangement for the safe method of handling electrical equipment for every known car of American manufacture now in service. It is built of a fine quality of seasoned lumber, and is finished on both sides, making a handsome appearance, and can be attached to the wall or arranged on a stand or case. The cabinet is finished in mission.

The cabinet has a capacity of 200 "G" 12 or "G" 16½ bulbs, sufficient headlight bulbs of the various voltage and candlepower for all the cars in use. The dash and tail lamp compartment will accommodate 243 bulbs. The cabinet has 24 separate compartments, which will carry a complete line of all the fuses used in 106 different makes of cars.

A convenient arrangement is provided for carrying an assortment of starting motor and lighting generator brushes, which are all catalogued in their proper compartments. For the convenience of the retailer, each cabinet comes equipped with a copy of the latest catalogue of electric bulbs. A table of fuses used in 106 different cars, and a catalogue covering the complete assortment of starting motors and lighting generator brushes.

Manufactured by Miller Brothers, Lewisburg, Pa. Price $12 f. o. b. factory.

The Sliding Extension Gap-Lathe is capable of handling a wide range of work. It is provided with six quickly changed gear feeds and an extra large spindle. All the gears are covered with safety guards. The bed of the lathe is well braced and accurately proportioned throughout. The top sliding bed and main bed are planed full length and fitted together with dove-



tail construction. A screw and crank at one end draws the bed back when it is desired to widen the gap between the centers. Fair deliveries.

Manufactured by the Barnes Drill Co., 814-30 Chestnut St., Rockford, Ill. Prices, 5½ foot lathe, $650; 7½ foot, $700 f. o. b.

Fire-Gun. The Fire-Gun is a hand fire extinguisher that is effective for gasoline, oil or electric fires. It is a liquid pump

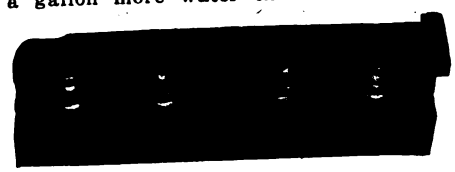


that is double acting from the first stroke until it is empty, overcoming the great defect in extinguishers that are only double acting when nearly full. It holds 25 per cent. more fluid than most extinguishers.

The Fire-Gun fluid is effective where water is useless. The maker claims it will not deteriorate, is a non-conductor of electricity, does not freeze at 50 degrees below zero, and will not damage machinery or delicate fabrics.

Manufactured by the Fire-Gun Manufacturing Co., Inc., New York. Prices: No. 1, capacity 1¼ quarts, $12; No. 2, capacity 1¾ quarts, $16.

Hudson Type Cylinder Head. A new cylinder head for Ford cars has just been put on the market which should be an interesting fitting for Ford owners desiring to secure more speed and better combustion. This cylinder head, which may be interchanged with the standard Ford head in but a short time, is built of cast iron and constructed with an extra large water jacket holding approximately half a gallon more water than the standard



head. The water jacket completely surrounds the spark plugs, thereby keeping them cool at all times. It is said that better water circulation is secured because of the increased water passage size. The largest part of the combustion chamber is directly over the valves, while the inside is perfectly smooth.

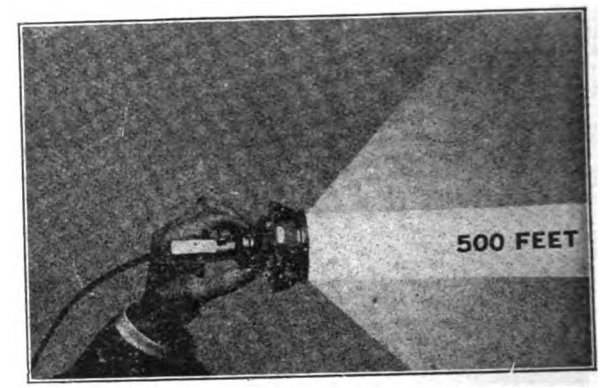
It is said that with this new cylinder head there is a noticeable increase of power, and that there is a saving of fuel.

Manufactured by Green Engineering Co., 34 S. St. Clair St., Dayton, O. Price quoted at request.

"Franco" Cellbeam Concealed Spot Lamp is a radical departure from conventional types of spot lamps in that instead of being used clamped to the windshield it is carried in the hand.

The device projects a concentrated beam which extends 500 feet in a straight line and a diffused glow which illumines near by objects at a greater angle. It is fitted with a six-volt nitrogen bulb and silvered reflectors. The exterior is finished in polished nickel and the handle is fitted with a focusing adjustment.

With the device is furnished eight feet of flexible cord, which is connected with



the battery in the usual manner, making an excellent "trouble lamp." The size is so small that it may be carried in one of the door pockets.

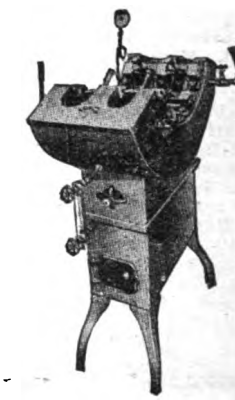
Manufactured by Interstate Electric Novelty Co., 104-114 South Fourth St., Brooklyn, N. Y. Price, $6.

Type E Cavity Retreading Outfit. The Akron Rubber Mold and Machine Co. has just brought out a new cavity retreading outfit, operating on the same principle as the regular cavity vulcanizer used for repairing casing punctures and blowouts.

This outfit with self-contained steam boiler (type E) can be purchased for much less than a retreading kettle and separate steam boiler, the use of large and expensive retreading kettle outfits being unnecessary since the development of the cavity retreading outfit.

The quality of work turned out with this outfit is said by the manufacturer to be fully equal if not better than work done by the kettle process, a number of the outfits having been in daily service by the big rubber companies for the last eight or nine months with the best of satisfaction both as to quality of results and convenience of operation.

With the type E outfit one-third of the tread is vulcanized onto the old tire carcass at a time, the entire tread being accomplished in three operations. The elaborate and time consuming system of wrap-



ping the tire required in the kettle process, is entirely dispensed with; the complete retread on an individual tire being accomplished as quickly with the cavity outfit as with the kettle.

The specifications are: Two-cavity outfit with self-contained steam boiler; cavities 4½-5inch and 3½-4 inch, the latter fitted with a reducing shell for taking 2½-3 inch sizes; made in one-third circle; cavities fitted with ribbed tread, with provisions for accomplishing plain tread by means of steel or special composition strips fitted into cavity; made with either gas or gasoline fittings; outfit includes steam gauge, water gauge, safety valve, two iron bars and eight clamps for holding tires in place, wrench, etc.

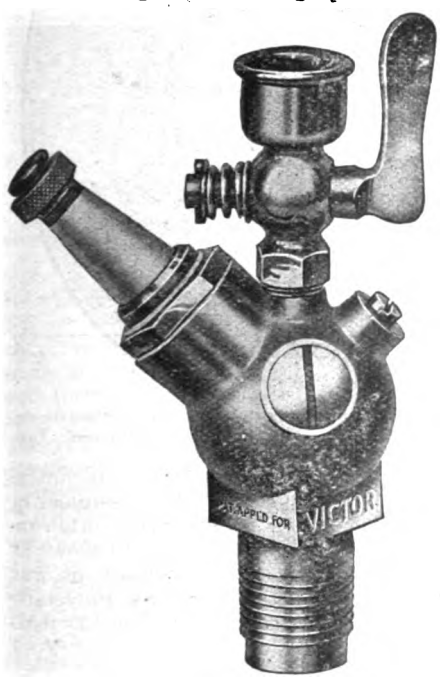
Manufactured by the Akron Rubber Mold and Machine Co., 945 Sweitzer Ave., Akron, O. Write for full particulars and prices.

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Victor Spark Plug. "The main point of difference between this and other plugs," says the maker, "is in the fact that we employ an external ignition chamber, and do not place our spark gap in the cylinder where it is fouled by oil and dirt and eventually becomes short circuited by soot or carbon and refuses to work.

"We are frequently asked if our plug does not work slower than those which are placed in the cylinder itself, due to the ignition taking place an inch or more away from the inside of the cylinder. Our answer is, it positively does not. It is particularly quick and snappy, due largely to the extremely explosive mixture of gas in the chamber."

By taking out the sight plug and using a screw driver on the adjusting screw, the spark gap can be readily adjusted while the engine is running without removing the plug. With a priming cup on the top of the plug, gasoline can be dropped directly on the spark gap, where it will do the most good. The priming device will particularly recommend the plug to users of Ford machines.



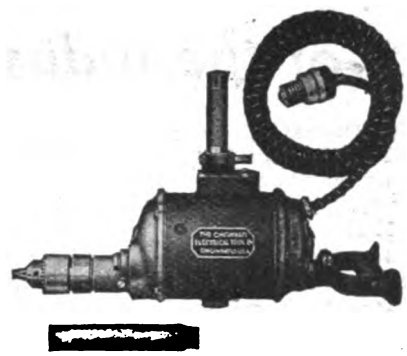
The plug, in addition to its use in automobiles, is adapted for use in kerosene engines, the non-sooting quality especially fitting it for such purpose. It also may be used in motor boats, stationary engines and airplanes.

Manufactured by the Victor Spark Plug Co., 250 Devonshire St., Boston. Price, with primer, $2; without primer, $1.75.

The Cincinnati Portable Electrical Hand or Breast Drill is made in ¼, ⅜ and ½-inch capacities. The drills are wound for alternating current, direct current and universal type for use with either direct or alternating current. In direct current the standard tools are wound for 110 and 220 volts, but they are also wound for from 50 to 600 volts if required. The motor windings are fully enclosed, dirt and dust proof, and all working parts are protected.

A fan mounted on the armature shaft forces a strong current of air through the ventilation holes in the motor housing and end cap. The armature is made of the highest grade of electrical sheet steel. It is wound with special magnet wire, thoroughly insulated, to prevent short-circuiting or grounding. The field coils are form wound and of the highest grade of magnet wire, carefully taped, baked and insulated. The commutator is made of segments of hard drawn bar copper, insulated throughout with the best grade of amber mica.

The gears are made of special high-grade steel, and are heat treated and



hardened, insuring durability and long life. They run in grease and are fully enclosed in the gear case at the chuck end of the motor. An aluminum plate separates the gear case from the motor housing, preventing oil and grease from getting into the motor windings.

High-grade annular ball bearings are used on both ends of the armature shaft. The chuck spindle is fitted with ball thrust bearing, reducing the friction load to a minimum. The outer race of the ball bearing that carries the armature shaft is held in place by a threaded nut and the inner race is locked to the armature shaft, so as to assure positive drive and to obviate all friction. The switch is entirely enclosed in a pocket on the side of the motor housing. It is the company's own special design, patented, and is operated through one of the side handles of the drill.

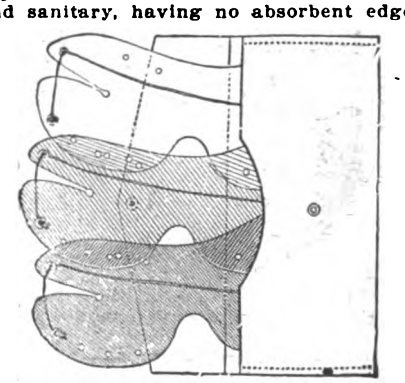
Drills of ½, ¾ and ⅞-inch capacities are made in single and two speeds. The speed is changed by shifting the wing nut, throwing the gears into high or low as desired, and can be changed while the drill is running. The carbon brushes are mounted in die cast brush holders. They are held firmly against the commutator by means of two springs pressing from the rear, insuring a perfect contact.

The side handles are of seamless steel tubing, knurled to give a firm grip. One operates the switch and the other handle is detachable when close corner drilling is desired. All drills are sent out well lubricated. Grease cups are provided for the spindle bearings.

The motor cap at the handle or screw feed end of all drills contains no electrical connections or mechanical parts, and is made so as to relieve the armature and bearings of all friction load and pressure. This is accomplished by fitting the cap over the special designed combination brush holder and ball bearing support. All electrical connections are made from the brush holder, which also supports one end of the armature spindle.

Manufactured by the Cincinnati Electrical Tool Co., Cincinnati, O. Prices quoted at request.

Featherweight Eye Protector. A convenient and clear vision eye protector with a number of practical points in its favor is illustrated. This device is made of a flexible material and after being worn a few times fits itself to the face, making it comfortable. It is fitted with adjustable elastic cords and is both strong and sanitary, having no absorbent edges to catch the dirt. It may be conveniently carried in a hand bag with no danger of breaking. The device may be purchased in envelopes with two in the package or in a strong wallet as illustrated, containing three of assorted colors, white, amber and green.



Manufactured by Jay & Dee Specialty Co., 1127 Bedford Ave., Brooklyn, N. Y. Price for envelope of two, 25 cents; wallet of three, 50 cents.

Old Sol Automobile Roadlights. In the Old Sol series the dealer has a model to fit every customer's needs. Model No. 70 is popular with motorists. It is a very powerful searchlight, with seven-inch door. The regular equipment includes central beam bulb controlled by "on" and "off" switch in handle, focusing device



integral with switch, Universal bracket fitting all windshields, straight or tapered four-inch adjustable diminishing mirrorscope and four feet of duplex cable.

Model No. 77 is practically the same as No. 70, but a little smaller. It has a six-inch door and a three-inch diminishing mirrorscope, also the universal bracket, adjustable to fit all windshields, straight



or tapered. It is equipped with switch and focusing device in handle. It is a handsome light, beautifully finished in black enamel, with highly polished genuine silvered reflector.

Old Sol display stands are unusually attractive and make many sales for Old Sol dealers.

Manufactured by the Hawthorne Co., Grassmere Ave., Bridgeport, Conn. Prices, model 70, $8; model 77, $6.50. Write for information regarding other models and prices.

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Personal News of the Industry in Brief

E. B. Mull is now president of the Mull Wood Work Co., which company recently purchased the Tucker Wood Work Co.



E. B. Mull, President of the Mull Wood Work Co., Sidney, O.

S. Bloom has become a director of advertising of the Essenkay Products Co., Chicago, Ill. He has had a wide range of experience in advertising and merchandising, both in this country and Australia. For the past year Mr. Bloom has been in government service with the 41st Infantry at Camp Funston, Kansas.

H. G. Semmons is now with the Chevrolet Motor Co., Flint, Mich., as assistant sales manager. Prior to the war he was connected with the Studebaker Corporation. During the last year he was executive head of the tank and tractor section of the Detroit district ordnance office.

H. S. Lyons is again with the Cutler-Hammer Manufacturing Co. of Milwaukee, Wis. He is doing sales work in the magnetic gear shift department. Mr. Lyons was in the aviation service. Previous to entering the war he had charge of the sale of C-H electrical devices in the territory covered by the Chicago office.

Paul LaCroix has been elected vice president of the Rubay Co., Cleveland, O. He has been in the industry for 23 years and was formerly the plant's general manager.

J. K. Cravens, formerly with the Excelsior Motor and Manufacturing Co. of Chicago, Ill., the F. A. Ames Co. of Owensboro, Ky., and more recently with the Wright-Martin Aircraft Corporation, has become associated with the Duplex Engine Governor Co., Inc., Brooklyn, N. Y., as sales manager. George L. Ritter, who has been with the company several years, has been promoted to assistant sales manager.

John H. Erben has joined the sales force of the Hartford branch of the Firestone Tire and Rubber Co. He will devote his attention to the local territory.

J. C. Thomas is now sales manager of the Penn-American Motor Co., distributor of American Six cars for the Philadelphia territory. His headquarters will be at 2401 Market street.

A. H. Mason is now in charge of the solid motor truck tire department of the Firestone Tire and Rubber Co. of the Hartford branch.

George Gunn has accepted the position of general manager of the Kelly-Springfield Sales Co., Seattle, Wash. He was formerly a distributor for Kelly-Springfield motor trucks at Tacoma under the firm's name of the Gunn Motor Co.

John J. Plath has rejoined the Maxwell Motor Co. and has resigned as director of merchandising for the Harroun Motors Corporation. At one time he was supervisor for the North Atlantic division for the Maxwell organization and was later in charge of all distribution as sales manager.

A. J. Wise, formerly with the F. B. Stearns Co., Cleveland, O., and later with the New York branch of the Paige-Detroit Motor Car Co., has been appointed manager of the New York organization.

J. C. Given has become sales manager of the power division of the L. A. Young Industries, Inc., Detroit, Mich. He was formerly southern district manager of the company. Mr. Given will make his headquarters at the Shelbyville, Ind., plant. For many years he was connected with the United States Tire Co.

E. B. Ross, who has been elected Mayor of Buchanan, is receiving congratulations from his many friends in the automobile industry. He is vice president of the Clark Equipment Co., Buchanan, Mich. He has had much to do with developing internal gear axles and disc



E. B. Ross, Vice President Clark Equipment Co., New Mayor of Buchanan, Mich.

steel wheels which were invented and produced in the Buchanan plant of his company.

Milton W. Franklin is now with the Remy Electric Co., located at the factory at Anderson, Ind. Mr. Franklin has



Milton W. Franklin, Electric Engineer, with Remy Electric Co., Anderson, Ind.

made valuable contributions to technical publications, especially on the subject of ozone, which are regarded as authoritative and constitute the accepted views at the present time. For two years he was professor of radiology at the Polyclinic in New York and director of the Department of Radiology in the New York Health Department. He has been connected with various electrical railway companies, with the General Electric Co., and was president and general manager of the C. & C. Electric and Manufacturing Co. of Garwood, N. J. He is a member of most of the leading technical societies of this country.

Charles L. Davis has become associated with the George W. Browne Automobiles, Inc., Milwaukee, Wis., as sales manager. He was formerly manager of the Milwaukee branch of the Winton Co. and previously was sales supervisor for the Winton company.

Alfred Reeke has been elected a director of the Retail Division of the Milwaukee Association of Commerce, for a two-year term. He is the head of the Alfred Reeke Co., 455-65 Broadway, Milwaukee, distributor and dealer in Nash passenger trucks.

H. L. Brubaker has been transferred to the general offices of the International Harvester Co., Chicago, Ill. He was formerly manager of the Madison branch of the company. Mr. Brubaker is succeeded by B. B. Repert, who was manager of the branch at Dubuque, Ia., for several years.

Thomas R. Hutchins has resigned as service supervisor for the Willys-Overland Co., with headquarters in St. Louis. He is president of the Quincy Auto Trade Association. For several years he was service manager for the Overland Co. at Quincy.

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Matt R. Korshin has become western sales manager for the Selden Truck Sales Co., Rochester, N. Y., with headquarters at 2334-36 Michigan avenue, Chicago, Ill.



Matt R. Korshin, Western Sales Manager, Selden Truck Sales Co.

He was eastern sales manager for the Atterbury Car Co., Buffalo, N. Y. Mr. Korshin succeeds A. R. Kroh, who has become associated with the Goodyear Tire and Rubber Co., Akron, O., as western sales manager. The dealers' organization in Illinois, Indiana, Wisconsin, Minnesota, North and South Dakota will be in charge of Mr. Korshin.

Charles Kuehn is now head of the advertising and sales promotion department of the Packard Detroit branch. He has been with the Packard advertising department for a number of years.

R. E. Flick has been made general superintendent of the garage and service department of the Golden Motor Sales Co., Grand Rapids, Mich.

R. A. Loftus, formerly assistant sales manager of the Cleveland Tractor Co., has been appointed factory representative of the Hession Tiller and Tractor Corporation, Buffalo, N. Y.

W. E. Marvel is now district manager of the Service Motor Truck Co. in Utah, Colorado, Wyoming and parts of Mexico and Idaho.

W. R. Eaton has resigned as district sales manager of the Moon Motor Car Co., St. Louis, to become president of the Aconite Tire and Rubber Co., St. Louis, Mo.

K. W. Macra, for the past five years in charge of the Canadian sales for the Saxon Motor Car Corporation, has resigned.

Frank R. Farnham, formerly sales and advertising counsel of Hollister-White & Co., has resigned and been elected vice president of the Rex W. Wadman organization.

C. F. Rouze is now in charge of the sales promotion department of the General Motors Truck Co., Pontiac. He was formerly sales manager for the Knox-Martin Tractor Co.

L. B. Cravath has resigned as western sales manager of the Cleveland Tractor Co. to become vice president and general manager of the Hession Tiller and Tractor Corporation, Buffalo, manufacturer of Wheat tractors.

Stuart S. Rydehn is now superintendent of the factory of the Bantam Ball Bearing Co., Bantam, Conn. He succeeds Edward H. Cox, resigned.

J. E. Pennybacker has resigned as chief of management of the United States Bureau of Public Roads to devote his energies to American Automobile Association highway work.

Fred W. Thomas has opened a consulting and sales office at 335 Guardian building, Cleveland. He was formerly chief engineer for the Olympian Motors Co., Pontiac, Mich.

Charles G. Jerosch has been appointed manager of the export office of the Corbitt Motor Truck Co., Henderson, N. C. This is a new office which has recently opened at 66 Leonard street, New York City.

O. S. Tweedy has resigned as vice president and general manager of the L. A. Young Industries, Inc., Detroit. He was formerly with the United States Tire Co.

H. H. Burger has become manager of the Stewart Products Co., Cleveland, O. The company has been operating a Stewart-Warner factory branch and has changed to a service station.

C. R. Collins has resigned as advertising manager of the Ajax Rubber Co.. Inc., to become a distributor of Racine tires, manufactured by the Racine Rubber Co., an Ajax subsidiary.

Arthur J. Peebles, formerly special representative of the Goodyear Tire and Rubber Co., is now general sales manager of the Armstrong Rubber Co., Garfield, N. J. Mr. Peebles is well known to the trade as the former secretary of the Ohio Automobile Trade Association and as an active worker in the affairs of the old National Automobile Trade Association.

R. R. Englehart, Iowa, is a member of the committee named by the board of directors of the Automotive Equipment Association to have charge of a show to be



R. R. Englehart, Member of Exhibit Committee.

held in Chicago next fall. Other members are L. P. Halladay, Illinois, chairman; G. L. Brunner, New York; W. K. Norris, Missouri; F. B. Caswell, Ohio.

C. Howard Wills, who was for 15 years connected with the Ford Motor Co. and before the organization of that concern with Henry Ford, and who was credited



Howard Wills, Automobile and Industrial Engineer, for 18 Years Associated with Henry Ford, Resigned from Ford Enterprises.

with having income from his connection aggregating $2,000,000 a year, has resigned. No announcement has been made by Mr. Wills as to his future plans. Mr. Wills is said to have engaged in the development of Ford cars and because of the uncertainty of Ford as to financial returns, agreed to accept five per cent. of the net profits of the company, which agreement, with modifications, continued until Mr. Wills voluntarily relinquished it.

E. F. Jarvis has become associated with the Four-Wheel Drive Auto Co., and his headquarters will be in the First National Bank building, Chicago. His territory includes Illinois, Iowa and Indiana. Mr. Jarvis first began as a salesman for the Chicago branch of the Locomobile Co. He has also been associated with Henry Paulman & Co., and with the Chicago branch of the Maxwell Sales Co.

F. M. Leston-Smith has resumed his duties as vice president and general manager of the Oregon Motor Car Co., Portland. He was in army service in the tank corps and recently returned from France.

W. B. Doan is now sales manager for the W. S. Dulmage Motor Co., Chevrolet distributor, Seattle, Wash. He was formerly distributor of the Saxon and Paige cars in Portland, Ore.

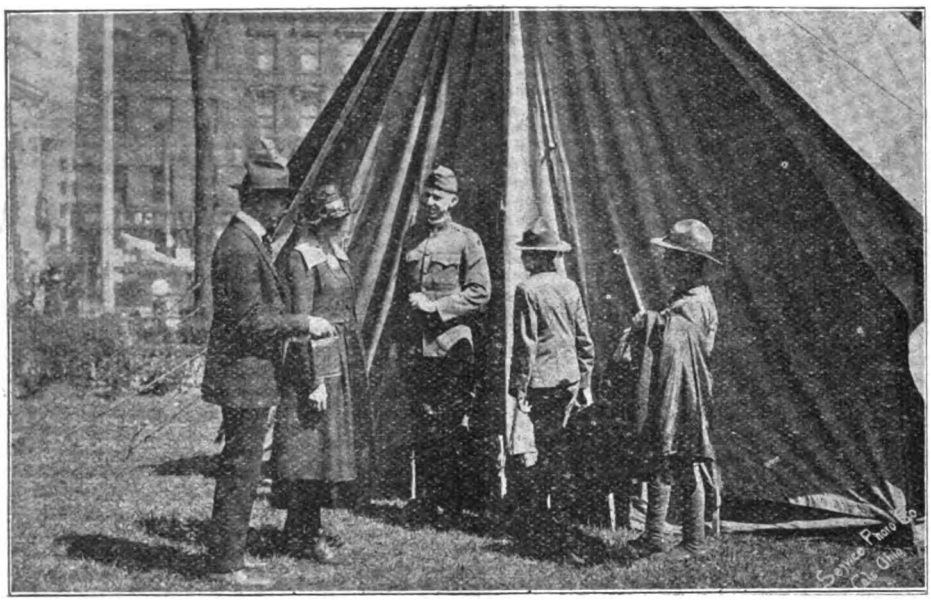
W. J. Peterson has become manager of the Goodyear branch in Cincinnati, O. He was formerly service manager of the Philadelphia branch of the Goodyear Tire and Rubber Co.

William M. Hartford, who was formerly with the International Harvester Co. of Chicago, has been appointed manager of the truck department for Shields-Livengood Motor Co., Seattle, Wash.

Christian Girl is back with the Standard Parts Co., Cleveland. Since the beginning of the war Mr. Girl has been in service for the government.

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METHODISTS PLAN AUTO CARAVAN



Chaplain Welcomes Tourists.

TRANSPORTATION experts engaged in routing the various automobile caravans which will start for the great Methodist centenary celebration at Columbus, O., June 20 to July 13, estimate that 40,000 machines will convey approximately 175,000 visitors to the religious exposition.

One of the largest of these caravans, arrangements for which have been fully made, will start from Springfield, Ill. Dr. E. M. Antrim, Springfield, who has been chosen as caravaneer, has enlisted 1000 automobiles for the tour.

Another large caravan has been organized by W. H. Cable of Council Bluffs, Ia. This consists of almost 200 cars and will start from the Hawkeye state early in June.

Caravan Idea Popular.

That the caravan idea is a popular one with automobile owners is evidenced by the fact that reports of the formation of new caravans are daily received at the centenary celebration headquarters, Columbus.

Because the automobile caravan is such an absolutely new thing, preparations for its routing and accommodation were necessary. Experts were engaged to route the various caravans, special road maps have been made, lists of hotels and motor service made up and sent to 75,000 automobile owning church members, and arrangements made at Columbus to park as many as 40,000 machines in a single day. Provisions also have been made for accommodations for auto parties along the way.

The automobile clubs of Columbus and Ohio are cooperating with centenary celebration officials, doing everything in their power to facilitate the delightful tours of these pilgrims to the modern mecca.

Plan "Tent City."

As a great number of automobilists have expressed desires to make the trip to the celebration a sort of "outdoor vacation," the celebration management has arranged to have a "tent city" for the accommodation of those who wish to live in the open. Chaplain S. L. Martin of the 148th regiment, 37th division, has been placed in charge of this project. Chaplain Martin will have tentage for more than 50,000 persons. He also is arranging parking space for 20,000 machines close to the "tent city."

Every convenience will be provided for motorists at the celebration grounds. Repair shops, supply stations and garages are being placed at various points inside the exposition gates.

Fine roads and beautiful country, combined with 24 days of fascinating sight seeing at the celebration, with four Sundays upon which to choose a list of the greatest preachers in the United States appearing in the many churches of Columbus, will round out for the automobile tourist a summer's vacation always to be cherished in delightful memory.

HELPFUL SUGGESTIONS AND HINTS FOR MOTORISTS.

Carry an indelible pencil in your tire repair kit. When you find a leak in a tube you must mark it so as to find it again. A black lead pencil is useless, but indelible mark will remain.

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If your engine is slow to warm during cold weather and the hot air intake does not leak, give it a richer mixture by means of the choke valve. But do not do this too long, as raw gasoline will be drawn into the cylinders and may result in carbonizing them badly.

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If you open the relief valves to look for a cylinder missing explosions and fail to see a flame, do not condemn that cylinder. Open the throttle and give it enough gas to fire. When the throttle is closed and the relief valve open the engine sucks in so much fresh air that some cylinders will not fire.

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In folding down the top be careful that none of the cloth is caught in between the bows where the metal parts come together. The cloth will soon wear through and the appearance ruined.

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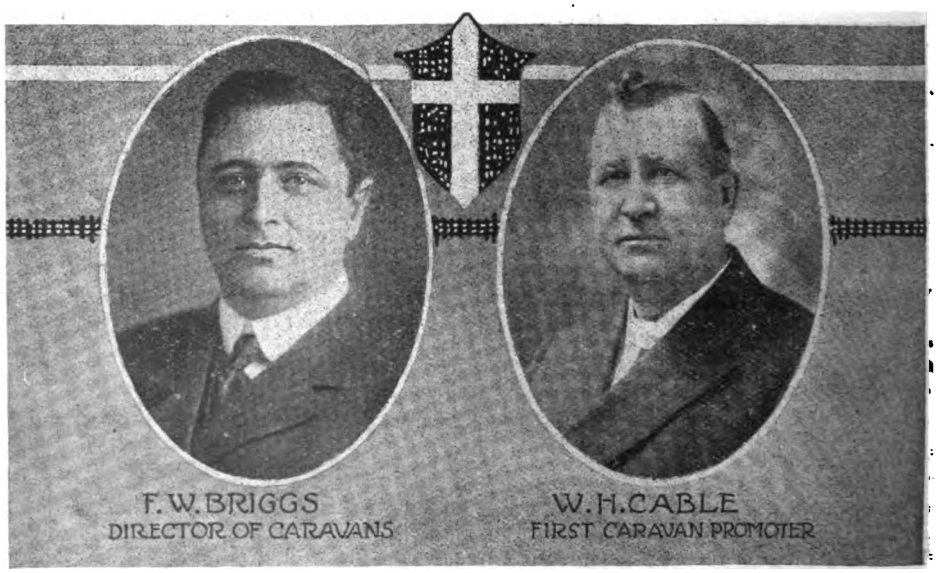
A squeak in one of the cylinders is a serious matter and must be attended to immediately. Lack of oil is indicated and some must be introduced through the relief valve or the spark plug opening. Do not put oil into all the cylinders.

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A little more attention to the lubrication of the steering gear will make steering much easier. If there is no grease cup remove the plug and force heavy oil or transmission grease in by means of an oil gun.

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The same advice applies to the ball joints of the drag links, except that they need cup grease instead of a thin lubricant. If they do not carry a grease cup they should be taken apart and packed with grease.



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TEMPLAR POPULAR MODERATE SIZE CARS

CONCENTRATING upon the development and production of one model chassis, the Templar Motors Corporation, Cleveland, O., has strived to make a car of moderate size that will meet exacting requirements in performance, appearance and economy.

The dominant feature of the Templar car is the overhead-valve, four-cylinder engine of exclusive Templar design, built in the Templar shops. The aluminum crankcase is cast to include the flywheel and clutch housing. This case carries the three main bearings of the motor. A Morse silent chain running in a constant shower of oil is used to drive the camshaft and the electric generator.

The belt-driven 16-inch fan runs on double annular ball bearings, and is mounted on an adjustable bracket. The centrifugal water pump made of aluminum, is driven by a cross shaft on the front of the motor. The left end of this cross shaft operates the ignition distributor. The cross shaft is driven by a helical bronze gear, keyed to the camshaft.

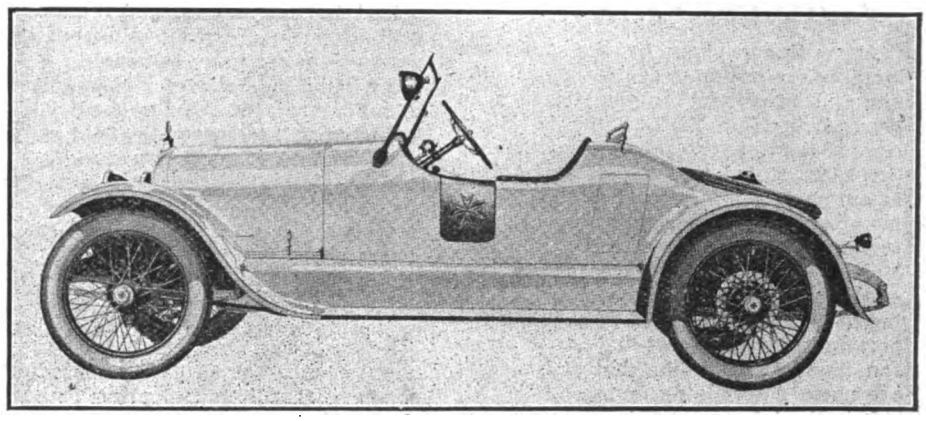
The engine, four-cylinder, cast en bloc, with four-point support and detachable head, has a bore of 3⅜ inches and a stroke of 5½, with 197 cubic inches displacement. The horsepower is 18.23 S. A. E. rating and 43 at 2100 revolutions per minute actual. The maximum motor speed is more than 2800 revolutions per minute.

Specifications.

The wheelbase is 118 inches, tread 56 inches, clearance 10 inches and turning radius 19½ feet. The weight is 2750 pounds. The gear ratios are 4.4:1 and 4.8:1. The length over all (top down) is 14 feet six inches, and the maximum width five feet eight inches.

Lubrication is force-feed by gear pump to valve rocker shaft, timing gears and to all engine bearings through the drilled crankshaft. All the oil passes through a fine screen filter. The capacity of the oil reservoir is six quarts and the level is indicated by an oil gauge on the crankshaft back of the cylinder block.

The method of carburetion is depended upon for economy. Air is heated by passing through a large "stove" surrounding the exhaust pipe directly through a passage cast in the cylinder block to the Zenith carburetor. The mixture is carried to the cylinders through the intake manifold, which is cast integrally in the detachable head, and entirely surrounded by the water jacket.



Templar Two-Passenger Roadster.

The flexibility and the hill climbing ability of the Templar motor are largely due to its sturdy counterbalanced crankshaft upon which the counterweights are forged integrally.

Other Features.

The starting and lighting is the Remy two-unit system. Ignition is by high-tension battery distributor system, with a combined automatic and manual spark advance. The frame is five-inch channel section, narrowed to 27 inches at the front to provide for short turning, with the maximum width 40 inches. The frame is arched 5½ inches over the rear axle to provide full action for the underslung rear springs.

The front axle is I beam section. The steering knuckles are inverted Lemoine type. The rear axle is the fixed tube type, semi-floating. Both service and emergency brakes are internal expanding on the 14-inch brake drums. They are lined with "Thermoid." These brakes are exceptionally large for the weight of the car, the service brake being two inches wide.

The drive is of the Hotchkiss type, drive and torque through the rear springs, which are flat under load. The steering gear is semi-irreversible screw and nut type. The left-hand drive is standard, but the right-hand drive may be obtained on special order for foreign trade. The clutch is a Borg & Beck single dry clutch with multiplying levers, and provided with ball bearing release collar.

Transmission is of the selective type sliding gears—three speeds forward and reverse. The wheels are of the artillery type. For fuel supply the Stewart-Warner vacuum system is employed, with a 19-gallon supply tank, including a two-gallon reserve, carried at the rear of the chassis. The standard equipment for tires is 32-4-inch, straight side Silvertown or Goodyear cord, rib tread, front non-skid.

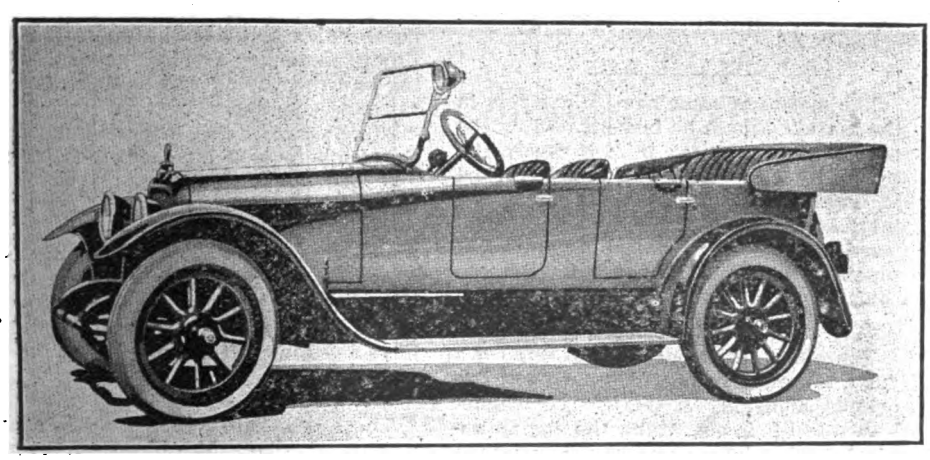
Body Types.

The Templar body is accentuated by its sturdy, long, low-hung, comfortable appearance. The car is said to average from 18 to 20 miles per gallon in ordinary service and from 20 to 25 by careful driving.

The Templar two-passenger roadster is a new creation in the sport model class. The seats are staggered four inches. When the top is removed the back rail slips down and becomes a hand rail, or the rear section may be left up as a dust shield when roof section is removed. When demounted the top is stored in a special bag and is carried in the baggage compartment.

The Templar four-passenger sportette has all the comfort and knee room of the touring car and also gives easy access to the tonneau through the rear doors. The Victoria-Elite, a four-passenger model, is equipped with a Victoria top. The five-passenger sedan is custom built throughout. The Templar factory will furnish estimates on any type of special enclosed body and co-operate with the purchaser in securing just the effect desired.

The prices are: Five-passenger touring car, $2185; four-passenger Sportette, $2195; four-passenger Victoria-Elite, $2285; two-passenger touring roadster, $2385; five-passenger sedan, $3285; chassis, $1850.



Templar Five-Passenger Touring Car.

The George Grow Tire Co., Boston, has opened a branch at 67 Empire street, Providence, R. I., with Charles Montague as manager.

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Says No Reduction In Auto Prices is Near

At a dinner given by the American Motors Corporation to dealers, parts makers and prominent automobile men in general, in New York, Ralph D. Mock, comptroller of the Hydraulic Pressed Steel Co., stated that a substantial drop in automobile prices need not be looked for after July 1. Present prices are governed largely by labor costs, said Mr. Mock. In its raw state the actual cost of the material that enters into the making of an automobile is a very small proportion of its final cost and for this reason fluctuations in the material market are not a determining factor.

It is the labor required to work up the material into finished units which are finally assembled into a complete car that governs the cost in the last analysis, and it is not likely that there will be a reduction in the prices paid for labor.

On the contrary there is a general feeling among automobile manufacturers that in the process of readjustment that is now going on wages should be maintained at present rates.

There is a growing tendency among parts makers to demand a better grade of workmanship due largely to the refinements that have grown out of their experience in war work, and manufacturers as a whole are willing to pay the increased cost that is necessary to secure better workmanship.

Manufacturers in the automobile industry do not demand a reduction in wages and there is no likelihood that labor would stand for it if they did.

Mr. Mock also stated that from information he had the outlook for the sale of automobiles this year was unusual. Partly out of patriotic considerations and partly on account of the shortage of cars during the past year automobile owners have been making their old cars serve them, and as a result their old cars in many instances are ready for the scrap heap. As a result of this condition a demand for new cars has developed which has literally overwhelmed manufacturers, who are still struggling with the problem of getting their plants on a quantity production basis.

DEMAND FOR LOW PRICED CARS IN ITALY.

Many requests have recently been made to his office, reports Trade Commissioner M. J. Chiesa of Rome, for agencies, exclusive or limited, representing automobile manufacturers. There is a great demand for a lightweight low priced car. He says that the war has lessened the buying power of the people in the large cities of Italy, but the smaller towns and cities, whose population is of the rural and land owning type, have increased their resources. It is from these rural districts throughout the provinces that the demand is greatest. For instance, in Macerata, whose population is about 20,000, there are now 500 cars in use.

The car most suitable is one simple in its construction, lightweight and selling at $600 to $1000 delivered. Most of the Italian cars now available are too high priced for this market, and the majority of the people are postponing purchases until prices are more favorable.

Mr. Chiesa believes that American manufacturers of the lower priced cars would do well to survey the field and prepare for future possibilities.

England to Stamp Cars from Concrete

Interest has been created by the announcement of an English manufacturing company that it is preparing to put on the market an automobile that can be retailed for $250, certainly for not more than $300.

Scarcely any wood will be used in the construction of the car, the principal material being a new substance which is described as "a kind of concrete, light, but strong and durable, produced from waste material such as slag, clinkers and sawdust, and covered with a metal solution."

The process of manufacture is another innovation in England. All parts, including wheels and chassis, will be stamped out, each complete in one piece, and then fitted together.

The manufacturers expect to compete with cheap American cars, because "tax and freight charges are expected to raise the price of the American article considerably above the figure asked from United States buyers."

AIRSHIP AS COMMON AS AUTO IN NEXT DECADE.

The airship will be as common as the automobile in 10 years, Alan B. Hawley, president of the Aero Club of America, said in opening the second Pan-American Aeronautic Congress in Atlantic City, which was attended by 500 delegates. "We are all confident," he declared, "that the next Pan-American convention at Atlantic City will see the delegates arriving from Europe in luxurious air cruisers and fast flying transports from South America. When the questions before this convention are solved there will still be others of great magnitude, undreamed of today, arising out of present achievements."

The merits of some new vulcanizers in the market should be investigated by the person who lives far from a repair station. Some of them are easily worked and make a very satisfactory patch on a tube, saving time and giving the use of more tubes, besides the saving in cost of repairs, which will soon pay for the vulcanizer.

The efforts of a beginner to remove a valve after it has been loosened are frequently amusing. If there is no magnet handy to lift it out, crank the engine until the valve is up far enough and then slip a loop of ordinary string around it.

France to Make Low Priced Autos

A determined effort is being made to manufacture low priced automobiles in France, and it may be expected that every protection will be afforded this industry. The important munition plant at Citroen has been transferred into a factory designed to develop a 10 horsepower, four-cylinder machine, consuming 7½ liters (two gallons) of gasoline per 100 kilometers (62.14 miles). Its chassis weighs 400 kilos (882 pounds) and the machine is supposed to develop a speed of 65 kilometers (40.39 miles) an hour.

The importance of this industry will be realized from the fact that material for the construction of the first 30,000 chassis is now being worked, and that the machines are already beginning to appear on the market. The Citroen plant while manufacturing munitions developed its capacity to 50,000 shells per day.

It is estimated that by April 100 automobiles will be produced daily; and there is a project for the doubling of the capacity of the plant if market conditions should render such a course desirable. The price of these cars will be 7250 francs ($1399) to 9000 francs ($1737), according to the type of carrosserie; that is, torpedo shape (for three or four passengers), sedan, coupe de ville, etc.

All equipment and accessories are included in the above mentioned prices. The plan of the organization of this factory is based on American methods.

BOSTON WILL HAVE INVASION OF JITNEY 'BUSES.

Greater Boston is about to succumb to the jitney. While many other New England cities have adopted this mode of transportation, Boston looked askance on the idea and loyally stuck to its "L" system. The present eight-cent fare has probably caused a change of heart, especially among those who ride short distances.

The first step toward jitneying the Hub was taken when the secretary of state issued incorporation papers to the Metropolitan Boston Motor Transportation Co., with $100,000 capitalization, to do general motor transportation business, which includes the operation of a jitney passenger service, general trucking and the buying and selling of motor cars and supplies.

After the cars are in actual operation the company will buy additional jitneys and increase the number of routes as business warrants.

The proper way to take a jounce is to throw out the clutch and to coast slowly over it. Do not dash madly into mud holes, water bars, etc., and expect to have anything left of your car at the end of the year.

The Lewis Auto Repair Co. has opened a new shop at 1507 Hennepin avenue, Minneapolis, Minn., to repair tires.

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English Clubs Tackle Auto Fuel Problem

The problem of new automobile fuels which is attracting considerable attention in this country is being discussed with even more interest in England. An important step has just been taken there by the Royal Automobile Club and the Commercial Motor Users' Association which have jointly agreed to provide the necessary funds for a program of research in connection with the use of alcohol and alcohol mixtures as fuel in internal combustion engines.

The project is regarded as a very important one with great potentialities for good to motoring as it seems inevitable, it is said, that English motorists will be required to resort to alcohol in the near future because the needs of aviation will be so great that there will not be enough petrol and benzol to satisfy the demand.

CORK INSERT ADVERTISEMENTS PLEASE FORD OWNERS.

The interesting illustrations in the recent Cork Insert consumer advertisements have attracted wide attention. The appeal has been educational in nature. The driver's foot is shown in contact with the brake pedal. Then the floor of the car is cut away to show the bands, while a peek inside shows just what Cork Insert is used.

"We know that the Ford owner is impressed with this educational style of advertising," says Miles Smith, in charge of Cork Insert sales and advertising. "Why? Because of the very much larger number of Ford owners who are taking their pens in hand to write for the Cork Insert story. They're mightily interested in better linings for the Ford brake and transmission.

"I wish you would have your readers try this experiment: Have them show Ford owners in need of new lining three or four kinds. They will, nine times out of 10, choose the highest priced lining. They want the best they can get, because they realize that it means a smoother, better working Ford."

Cork Insert Transmission-Brake Linings retail at $3 for the set of three and are manufactured by Advance Automobile Accessories Corporation, 56 East Randolph street, Chicago.



GIVES TIMELY ADVICE AS TO TIRE INFLATION.

Timely advice is offered car owners as to tire inflation by H. G. Palmer, manager of the pneumatic tire department of the Goodyear Tire and Rubber Co., Akron, O., who says:

"Underinflation is always costly to the tire user, yet it is quite common, either though neglect or indulged in as a luxury. And like all other luxuries it is usually expensive. It is our desire to help every tire user to get the most miles out of his tires. We might make more sales if tires were used up as quickly as possible, but are believers in the kind of business built on satisfactory service.

"We urge tire users to let our Goodyear service stations help them get more miles from their tires. Our service stations exist for this purpose just as much as for the sale of goods. Get their advice as to tire inflation. Start the summer driving season right.

"If you have been running your tires underinflated because you have feared that higher pressure might injure them, this may interest you:

"We have often inflated tires to a pressure of several hundred pounds per inch in our factory, for experimental purposes —just to see what would happen. We have never yet burst a single tire in that way. In every instance either the rim or something else has given away first. So recommended pressures are safe pressures.

"It is also true that hot weather effect on tires—the expansion of contained air by summer heat—is not at all dangerous. We have made very careful tests to determine that point exactly.

"Experience also teaches us that the average inflation apparatus rarely gives the tire air pressure expected. There are a number of reasons for this, one being the air friction on the interior of the pipes. Therefore, we recommend that the table of proper air pressures which we have prepared be accepted as minimum pressures, if the car user wants the mileage that is built into his tires. The air pressure table for various sizes is given herewith." What Mr. Palmer says will probably surprise many motorists. Taking advantage of his advice will enable the car owner to get better tire results. Following is the table, which should prove a valuable guide:

Says GMC Not to Buy Ford or Other Firms

W. C. Durant, president of the General Motors Corporation, at the annual meeting announced that the company did not contemplate negotiating for the acquisition of the Ford, Maxwell or other companies. In explaining the action of the directors in recommending to the stockholders an amendment to the company's charter increasing the authorized issues of debenture stock to $500,000,000 and of common to $500,000,000, Mr. Durant said the purpose was to make provision for all future financing. It is understood that the directors will find it necessary to do some new financing in the near future to carry out the extensive plan for improvements and expansion recently announced.

At the annual meeting of directors W. P. Chrysler was elected first vice president and H. H. Bassett was added to the board of directors and executive committee and appointed general manager of the Buick division. Mr. Bassett and F. W. Hohensee, general manager of production of the Chevrolet division, were elected vice presidents.

A special meeting of the stockholders will be held on June 12 to pass on the proposal authorizing increase of capital.

The General Motors Corporation has acquired the properties of the Michigan Crankshaft Co., Lansing, Mich., and will spend $100,000 at once on extensions and equipment.

CHICAGO OPENS PUBLIC SCHOOL FOR MOTORISTS.

Chicago's first automobile school, which is a part of the regular city school system, was opened recently. Any car owner or member of his family who drives may enroll in the classess. Mechanics, chauffeurs and other professional automobile works also will be welcomed. The enterprise has the co-operation of automobile manufacturers, dealers and garage owners representing about 150 Chicago firms and trade organizations. This committee will give advisory aid in carrying out the instruction.

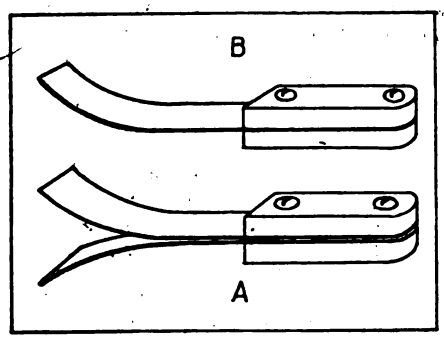
TIRE SECTION DIAMETER.

Infl. Press Cord	Fabric	3 in.	3½ in.	4 in.	4½ in.	5 in.	5½ in.	6 in.
27	30	250						
32	35	290	360					
36	40	335	410	500				
41	45	375	460	560	675			
45	50	415	515	625	750	875	1000	1140
50	55	460	565	690	825	960	1100	1125
54	60	500	615	750	900	1050	1200	1370
59	65		670	815	975	1135	1300	1480
63	70		720	875	1050	1225	1400	1595
68	75			940	1125	1310	1500	1710
72	80			1000	1200	1400	1600	1825
77	85				1275	1485	1700	1940
81	90				1350	1570	1800	2050
86	95					1660	1900	2165
90	100						2000	2280

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SUGGESTIONS FOR CAR OWNERS

EFFECTIVE SCRAPERS FOR REMOVING CARBON.



Carbon Scrapers.

The demon "carbon trouble" causes, perhaps, more trouble and loss of engine power than any other engine fault. Although many people believe that in order to dislodge carbon from the engine a removal of the pistons or engine head is necessary, the ejection of the demon may be accomplished simply through the hole left upon the removal of the spark plug. Get three lengths of steel clock spring, preferably about ⅜ inch wide and 10 inches long, and, after removing the temper from about four inches of the end, bore two holes through them and mount in handle as shown in the illustration. The holes will allow the handle screws to pass through the spring, holding it firmly in place. The free ends of the springs should be ground rounding. If two springs are mounted as shown at A the inside top of the cylinder and the piston may be scraped at the same time. Turn the engine crank over until the piston in the cylinder upon which the work is to be done is at the top of its stroke, insert the scraper A and move back, forth and around inside until some of the carbon is dislodged. Remove this loose carbon by inserting a tire pump tube through the spark plug hole and blowing, then repeat the operation with the scraper. With a little care most of the carbon will be removed by this process and the power of the engine greatly augmented.

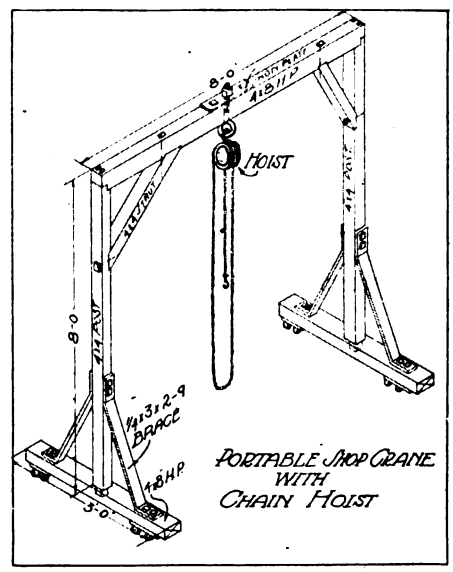
WOODEN SHOP CRANE.

A very handy shop crane was noticed recently in a garage repair shop that could not have been very expensive to build and yet proved itself very useful in lifting engines in and out of car frames. Its use on only a few jobs would easily pay for it. This crane was constructed as follows:

A stick of timber, either spruce or hard pine, eight feet long, four inches wide and eight inches deep is needed for the top or cross piece. This will be used to carry the block and falls later.

Next obtain two pieces eight feet by four inches for the uprights or side pieces. Now for the floor pieces take two pieces of heavy plank each three feet long, four inches thick and eight inches wide. Cut a mortise on one end of each of the uprights two inches by two inches and four inches long. Make a tenon to match this in the heavy plank or floor piece, exactly in the center and of the same size. The top ends of the uprights should be squared. Now on one side of the first upright, with a square, lay off a line four inches from the end. Turn the stick over sideways and continue this line, still using the square, around till it meets the line where it started. On this line one inch in from the edge make a cross mark. Turn the stick one-half over and mark again, being sure that these marks are exactly opposite one another. Do the same on the end. Take a saw and cut out the block on these lines. This will take out a block four inches by four inches by one inch. Repeat this operation on the second upright.

Square the ends of the eight feet by eight inches by four inches thick stick. Then with square lay off three inches from the end and square this around the stick till it meets the line at the start. Next measure off four inches on this line and mark it. Do the same on the opposite side, being sure that the lines are directly opposite. Mark off the end in like manner and then with a saw cut this block out. This block will be four inches by four inches by three inches. Leaving the end of the stick four inches by four inches and the cut away portion four inches by four inches and the depth of cut three inches. Do the same with the other end of this stick.



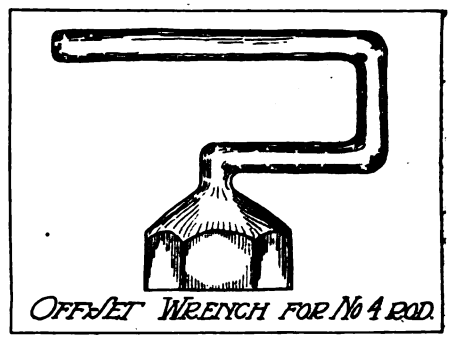
For the iron work have a blacksmith make you the necessary strap irons and brace irons. You will need for the bottom of the uprights four heavy braces of flat iron three inches wide and one-quarter inch thick. These irons should be two feet nine inches long with holes drilled in the ends for one-half inch bolts.

Eighteen inches down from the top of one of the side pieces, on the same side with the cut at the top, draw a line with a square. Follow on down the side and mark off one inch on this line. Turn the stick and mark the opposite side in the same manner, being sure that the marks come exactly opposite. Six inches above this towards the top square off another line. With a saw cut out this triangular piece. Do the same with the cross piece for the top. These are the seats for the corner braces of four inches by four inches stock, and later will be bolted together with one-half inch bolts. Work the other end in the same manner, marking off with the square 18 inches from the corner each way and cutting out for the brace seats.

In putting the crane together start with the floor pieces—that is, those pieces that rest on the floor in the finished crane. Next set up an upright with the notches on the stick to the side. Be sure that the mortise and tenon at the bottom fit snug. The upright can either be nailed or a hole bored and a bolt put through it crosswise of the plank.

Set up the other upright in the same manner and put on the bottom brace irons, bolting them in place as you go. Laying the two sides about nine feet apart on the floor with the brace slots and notches at top facing, and put the cross piece into place. Raise ends of the side pieces from the floor and rest them on a horse or on boxes.

OFFSET WRENCH FOR NO. 4 FORD ROD.



As every repair man knows it is no easy matter to find a wrench that will handle the around-the-corner bolts which fasten on the cap of the fourth connecting rod of a Ford engine. But if the wrench be bent, in the manner shown in the drawing, then the loop of the wrench will go around the edge of the opening in the bottom of the crank case and make it very easy to loosen the nuts from beneath the crank case. The handle of the wrench should be made of half inch steel.

In connection with this same lower crank case it is useful to know that one can easily determine whether the oil pipe is clogged by taking out the front bolt, on the right side of the lower crank case cover plate, and then running the motor slowly. If oil runs freely in 15 seconds, or less, the pipe may safely be assumed to be clear. To make a more permanent job drill and tap the bolt for a small petcock. If this petcock is opened each time the oil level is tested, one can be sure of good lubrication and it may prevent burned out bearings.

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POLICE TRAPS FOR AUTOISTS

Crusade Against Dazzling Headlight Is Planned In Bay State.

POLICE throughout New England and the East in general have begun their Spring campaigns against motorists who violate local ordinances.

The examining and investigating department of the State Highway Commission of Massachusetts is planning a crusade against dazzling headlights. The headlight law provides that the lamps must throw sufficient light to show any person or substantial object upon the roadway straight ahead for a distance of at least 150 feet; that no dazzling rays from the headlights shall be at any time more than 3½ feet above the ground on a level road at a distance of 50 feet or more ahead of the vehicle; also that there must be sufficient light to enable the operator of the motor vehicle to see any person, vehicle or substantial object upon the roadway or side thereof for 10 feet on each side of the motor vehicle and 10 feet ahead. Another part of the automobile law requires the display of two forward white or amber colored lights and one red rear light.

It is not the intention to put into court ruthlessly every driver of a car whose headlights are found not to meet the requirements of the law. At first every effort will be made to assist drivers to arrange their lights properly, especially if they have already made some attempt to do so. The inspectors have been instructed to do all they reasonably can to help motorists in adjusting and focussing their lamps. Flagrant cases, however, will be dealt with severely, either by a summons into court or by a recommendation to the highway commission that the car driver's license be suspended.

PROVIDENCE, R. I.

Speed traps are being operated on North Main street, West avenue, Francis street, Elmwood avenue, Broad street and Weybosset street.

The police are still working their trap on North Main street, between Garden and Commerce streets, principally to catch jitney men operating between Providence and Pawtucket. The trap on Francis street, running under the Union Station and to the foot of the State House hill, is still being worked by the traffic squad.

EAST PROVIDENCE, R. I.

Police of East Providence are prosecuting motorists for overspeeding through the thickly populated part of the town and also for passing trolley cars that have stopped to discharge or take on passengers.

PAWTUCKET, R. I.

The police of this city have announced that a stop is to be put to violations of the automobile regulations in the traffic zone in the center of the city. Motorists are being summoned to court for allowing their machines to stand on streets in the restricted district longer than the time allowed by law, and also for stopping the car on North Main street with the left side toward the curbing.

NEW HAVEN, CONN.

Watch red line near hydrants. Motorists must not stand within 15 feet on either side of hydrant.

STAMFORD, CONN.

The judge of the Stamford District Court has decreed that speeding here must stop at once. Officers are out on motorcycles.

ST. JOHNSVILLE, N. Y.

The authorities of this village are rigidly enforcing an ordinance prohibiting motor vehicles to be operated at a speed greater than 15 miles an hour on the public streets or highways. Traps are being operated all over the village and the minimum fine being imposed for violation of the law is $10 and the maximum $50.

QUINCY, MASS.

The police of this city are prosecuting motorists who fail to slow down and give a timely warning at Scammell street and Quincy avenue. Speed traps in various sections of the city are also being operated, particularly on the main highway going toward South Shore resorts.

CLINTON, MASS.

Chief of Police is operating speed traps all over the town on Saturdays and Sundays.

MALDEN, MASS.

Crusade against automobilists for failure to slow down and give a timely warning at intersecting streets in this city.

WAKEFIELD, MASS.

At Main and Sweetzer streets the police are stopping motorists who do not blow the horn and slow down when turning from one intersecting way into the other.

WELLESLEY, MASS.

Wellesley will shortly employ a motorcycle officer to prosecute motorists in that town for violations of the automobile laws, particularly for failure to slow down and blow the horn at intersecting streets, and for not making a proper wide turn at corners.

BROCKTON, MASS.

Traps for overspeeding are being operated by the police of this city on Warren avenue and on Main street.

Eight feet of street car law is being enforced by officers in this city.

NEWTON, MASS.

Do not exceed speed limit and slow down to eight miles per hour and blow horn at all intersecting ways.

MARLBORO, MASS.

The police of this city and Hudson are operating traps for speeding on blind curves on country roads and on the state highway between Marlboro and Northboro.

POLICE ACTIVITIES IN BOSTON

On Columbus avenue, past Northampton street, going towards Roxbury crossing. Police are prosecuting motorists for overspeeding and for violation of headlight dimmings law. Do not drive faster than 15 miles.

On Columbia road in Dorchester district. Officers in civilian clothes on duty every day from early morning to late evening.

Traps between Edward Everett square to Blue Hill avenue. On the latter thoroughfare a speed trap is operated towards Boston after railroad crossing bridge, near Walk Hill street.

Massachusetts avenue, Roxbury district, near Edison electric illuminating plant for overspeeding. Do not exceed 15 miles per hour.

Motorcycle officers assigned on Commonwealth avenue, between Arlington street and Massachusetts avenue; also along Commonwealth avenue. Motorists should slow down.

On Massachusetts avenue from Harvard bridge to Columbus avenue; on Columbus avenue from Berkeley street to Roxbury crossing; from Roxbury crossing to Eggleston square.

Commonwealth avenue, Exeter and Fairfield streets. At these two streets motorists may expect a trap for speeding, or for not slowing down and sounding their horns. Do not exceed 12 miles an hour approaching these two corners and sound horn.

Commonwealth avenue, junction Beacon street. Do not exceed 15 miles an hour in this locality.

Tremont street, trap from Winter street to Keith's theater. Between 7 and 11 o'clock do not exceed 15 miles per hour. Blow horn when approaching side streets.

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Park square. In the vicinity of the Motor Mart do not exceed 12 miles per hour and blow horn at all corners.

Beacon street. Trap from Charles street to State House. Do not exceed 15 miles per hour and blow horn vigorously approaching the corners. Officers usually stand at Joy street.

Beacon street, between Somerset and Bowdoin streets, Hotel Bellevue block, is one-way street and may be used only by motorists going north. Autoists going south turn off into Somerset street, Ashburton place, Bowdoin street, then into Beacon street.

Massachusetts avenue. Trap from Beacon street to Boylston street. Do not exceed 15 miles per hour and blow horn at intersecting streets.

Columbus avenue, Berkeley to West Newton street. Motorists may expect traps for not slowing down and giving signal at any of the streets between these two points.

Columbus avenue. Trap between Washington and Heath streets. Do not exceed 15 to 18 miles per hour.

Columbus avenue, near Eggleston square. Do not exceed 18 miles per hour and blow horn approaching side streets.

West Roxbury district. Walk Hill street, near schoolhouse and fire station. Trap. Do not exceed 12 miles an hour. Blow horn and slow down at cross streets. Entrance to Arborway. Slow down, 15 miles per hour and blow horn.

Blue Hill avenue, Morton street and streets on either side which enter this avenue. Blow horn and slow down to 12 to 15 miles an hour. On Morton street do not exceed 15 miles per hour at any point thereof.

Generally motorists may expect traps for either speeding or for not blowing their horns and slowing down on Beacon street from the State House to the junction of Commonwealth avenue and Beacon street and on Commonwealth avenue from the Public Gardens to Cottage Farm bridge.

Among the most active traps being operated in the Dorchester district are those on Morton street, near Blue Hill avenue, for overspeeding; Canterbury street, for overspeeding, and Blue Hill avenue, near Franklin Park, for overspeeding.

The police of the Mattapan section of the district are working a trap at Walk Hill street and the intersection of Hyde Park avenue for failure to slow down and give a timely signal.

On Huntington avenue at streets leading from that thoroughfare, slow down to eight miles an hour and give a proper warning. The police of the Back Bay and Roxbury districts are active the entire length of the avenue, prosecuting motorists who do not comply with the requirements of this regulation.

Boston officers in plain clothes at the junction of Massachusetts avenue and Southampton street, the South End district, enforcing the headlight dimming law.

The Brighton police have been prosecuting motorists for overspeeding on Beacon street, near the reservoir, going in an easterly direction below Hammond street, Newton. Care should be taken to slow down for an entering street on the right about 200 yards east of Hammond street. Those going over 20 miles an hour are liable to prosecution.

At Chestnut and Perkins streets, Jamaica Plain, the police are prosecuting motorists who do not slow down and give a timely warning.

READING, MASS.

Overspeeding and driving within eight feet of trolley car is enforced here.

LEXINGTON, MASS.

Do not drive faster than 15 miles an hour through this town.

REVERE, MASS.

Do not speed your car along the Revere Beach Parkway or the new Shore Drive, going toward the Point of Pines. The Metropolitan Park police are prosecuting motorists who exceed the speed limit along these thoroughfares.

ANDOVER, MASS.

Automobilists are being prosecuted by the police of this town for violation of the speed laws. The court is co-operating with the police officials in discouraging the practise by imposing substantial fines.

NEW YORK TO ATLANTIC CITY SHOULD PROVE POPULAR TRIP

ONE of the popular trips recommended by the touring department of the American Automobile Association is from New York to Atlantic City via Lakewood, and return via Philadelphia.

There are two ways to reach Perth Amboy from Manhattan. Motorists starting from upper New York favor the Lincoln Highway via the 42nd street ferry to Newark; thence Frelinghuysen avenue through Elizabeth, Rahway and Woodbridge to Perth Amboy, a distance of 30 miles.

The alternative is by way of the Municipal Ferry to Staten Island. Turn left along Bay avenue as far as Vanderbilt avenue, then right, and follow the Richmond road and the Amboy road to Tottenville, where take ferry to South Amboy. Both roads are in good condition practically throughout.

Leaving Perth Amboy, cross a long wooden bridge into South Amboy and immediately turn left on a rough road, about a half mile, leading into the center of the town. This route is much better than the notorious "Hole in the Wall," a very narrow, dangerous tunnel under the Pennsylvania railroad. From South Amboy there is an excellent new brick road through Morgan nearly to Keyport. Turn right at a prominent three corners and follow a fairly good gravel road through Matawan and Freehold to Lakewood, a distance of 65 miles from New York and an excellent stopping place for luncheon.

From Lakewood a good gravel road continues almost due south through Toms River, Barnegat, Tuckerton, New Gretna and Pleasantville to the "Ostend of America," Atlantic City.

The return trip from Atlantic City to Philadelphia follows closely the Pennsylvania railroad, running through Egg Harbor City, Hammonton and Laurel Springs to Camden, where a ferry crosses the Delaware to Market street in Philadelphia. Some construction work is in progress along this road in the vicinity of Hammonton, but a satisfactory detour has been provided.

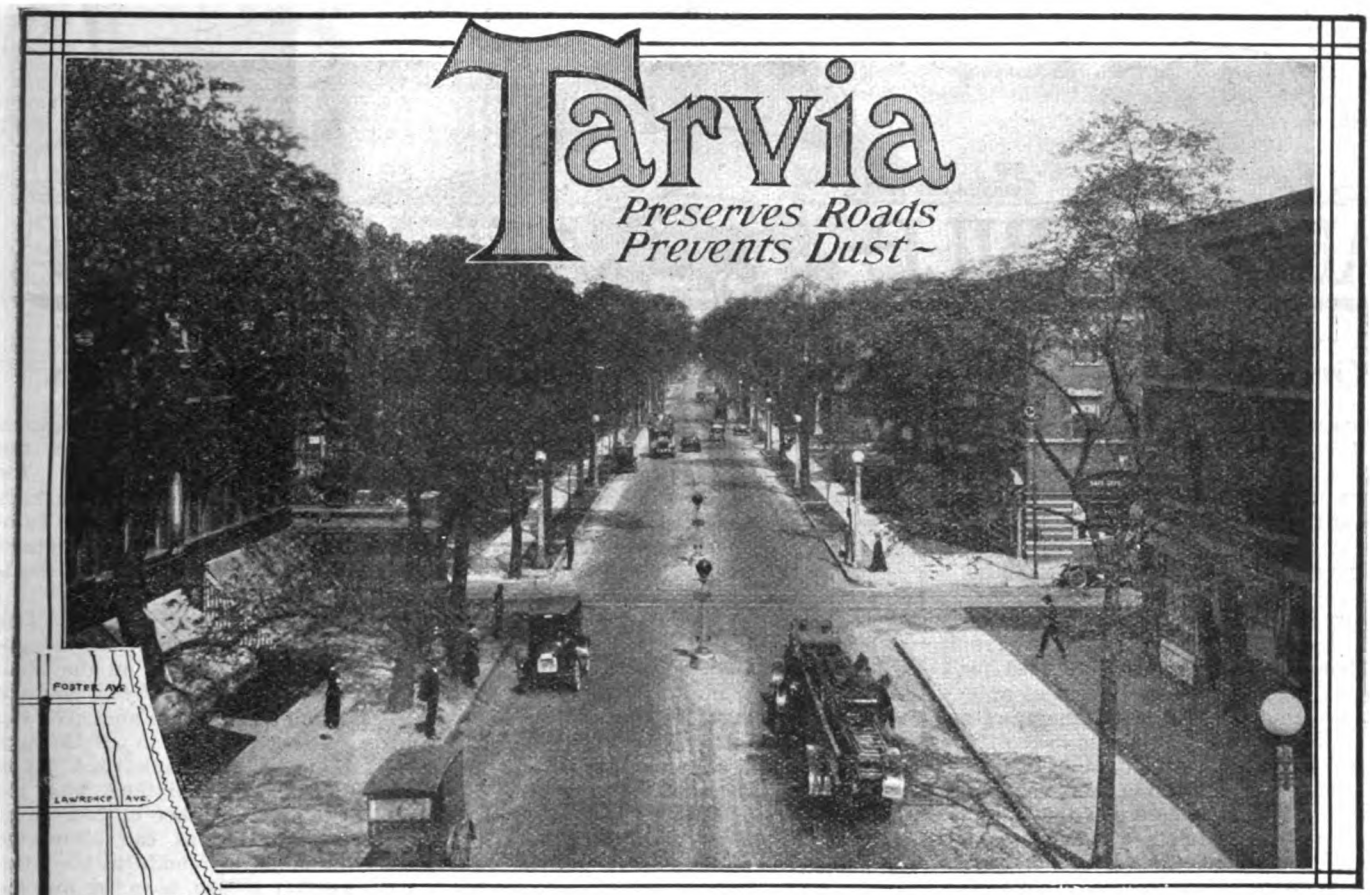
The Lincoln Highway, between Philadelphia and New York, offers a good, hard surface road through Bustleton and Langhorn to Trenton. The next stretch being closed for construction between Princeton and New Brunswick, the best route from Trenton leads through Mercerville, Robbinsville, Windsor, Hightstown and the Cranbury turnpike to New Brunswick. This road is good except for five miles of worn macadam near Hightstown. From New Brunswick the Lincoln Highway leads all the way back to New York via Metuchen, Elizabeth and Newark.

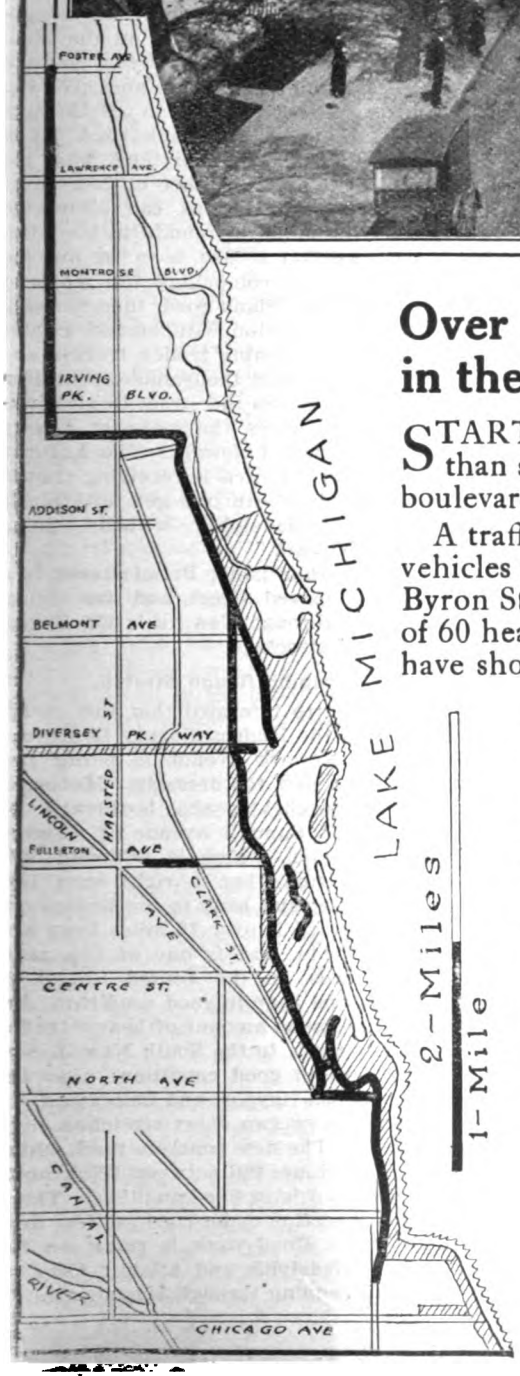
The total for this tour is about 295 miles, and the A. A. A. has prepared three strip maps which show the entire route in great detail.

The Lincoln Highway between New Brunswick and Princeton is actually under construction and therefore should be avoided. (The section between Metuchen and Rahway, which really has been notorious for its fluctuating condition, is now in the throes of reconstruction and when the new road is completed several bad, dangerous curves will be eliminated, as will the grade crossing at Iselin station and the under pass just beyond. In short, the new road will parallel the Pennsylvania railroad tracks. For the time being the old road has been put in fair condition.)

New York to Atlantic City via Lakewood—There is little preference between the Staten Island route and that via Newark to Perth Amboy—both average good. The road work between Wickatunk and Marlboro has been completed, it now being a splendid concrete road and in the near future work is projected to complete same through to Freehold. For the present the gravel road is in good condition. From Lakewood to Toms river a short rough stretch is found, but the scrapers are already at work on this road and conditions are rapidly improving; this remark also applies to the road for several miles in either direction near New Gretna. Nothing serious has been reported on the route, however; the same remark applying to the route via the Jersey coast to Seaside Heights and thence over the toll bridge to Toms river, etc.

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Over 6 miles of Tarvia-surfaced Boulevards in the Lincoln Park System, Chicago—

STARTING just above Chicago Avenue you can ride over more than six miles of smooth, firm, mudless, dustless Tarvia-surfaced boulevards, as shown by the black lines on the map at the left.

A traffic census taken on Sunday, July 21, 1918, showed that 10,700 vehicles passed over the Sheridan Road section of this boulevard, at Byron Street, between 10 A. M. and 7 P. M., including an average of 60 heavy double-decked buses every hour. Other traffic counts have shown as high as 12,800 vehicles in a single day at busy points.

This traffic is mostly automobiles, and for several months in the year the majority of them are equipped with tire chains, which are very hard on any road surface.

The weight of this daily traffic is estimated at more than 16,500 tons!

Such traffic would quickly ruin an ordinary macadam boulevard, but by treating the Lincoln Park System boulevards with Tarvia, the Park officials have been able to maintain a road-surface that is strong enough to stand even the tremendous strain of this heavy traffic.

Tarvia is a coal-tar preparation that makes roads smooth, dustless, mudless, water-proof, frost-proof and automobile-proof. It is made in several grades for varying road conditions.

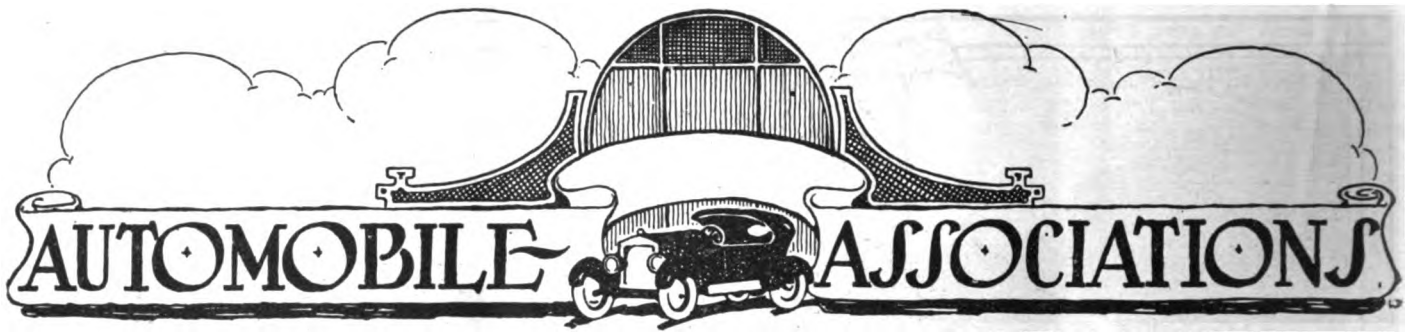
Over a period of years Tarvia roads are less costly than any other form of good road construction.

Write for illustrated booklet and further information.

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Organizing League

Harry W. Gaston, who is president of the Lexington Motor Car Co., New York City, is now organizing a league of motorists to run down what he terms "the Hun of the Road." The membership is to consist of private car owners who have not been convicted this year of violating any speed or traffic laws. Truck and taxicab drivers are not eligible for membership. In his prospectus Mr. Gaston says:

"There is a great big vital need for such a league. Private owners of automobiles are at present at the mercy of a certain class of truck, taxi and hack drivers who seem to take delight in making motorists' lives miserable. In many instances of late malefactors of this breed, who have the instincts of gunmen and gangsters, without their courage, have banged fenders off my car and have brought many of my friends to grief. I recall at least nine instances of this kind within the past week. In most cases these bandits of the highway stay inside the law and nothing is left the public except a civil suit for damages, and it is usually true that most of them have their cars and their other property beyond the reach of court process.

"There are many other perils on the highway with which the private owner of a motor car is familiar that existing laws and agents of the law do not cover and cannot reach.

Twenty-Five Thousand Members.

"With 25,000 members of such an organization carrying the emblem of such a league on the front and rear of their motor cars, evildoers would be brought up with a round turn. Life, limb and property would once more be secure.

"You men who sit at your desks, knowing that your wives, sisters and sweethearts are out in their cars—do you feel entirely easy? You know, no doubt, that your loved ones are careful, but you also know that the hazard of the road today lies not in what you may do, but in what the other fellow will do. Wouldn't you feel safer if you knew that your relatives' cars carried the red badge of caution?

"The league, as proposed carries no benefits to any one. It is not to be a profit making organization. Every dollar of the membership fees will be spent in protecting the members against the Hun of the road. A legal department will be maintained and a sufficient clerical force to handle the details. If a member is assaulted he promptly files a sworn statement with the league. The league does the rest. Perhaps the league cannot get results for one defense, but presently every reckless driver's complete record will be on file at league headquarters. Sooner or later, if he persists, as he probably will, he will be banished from the highways of New York and vicinity."

AUTOISTS WILL RUN DOWN "THE HUN OF THE ROAD."

A vigorous campaign against reckless and careless drivers would be conducted by the motorists' league, proposed by Harry W. Gaston, who characterizes this type of driver as "The Hun of the Road." The league would have 25,000 members, all of whom would be on the watch for motorists who fail to pay adequate regard to the safety of others. A legal department would be maintained by the league, and a detailed record would be kept of all reckless drivers. Truck and taxi cab drivers are not eligible for membership.

LONG ISLAND AUTO CLUB.

The Long Island Automobile Club, Long Island, N. Y., announces June 3 as the date for the annual Orphans' Day outing. This is always the biggest day of the year for that organization and for the hundreds of children who are its guests. Charles C. Cluff, who made a great success of last year's affair, has been designated again as chairman of the Orphans' Day committee. His associates on the committee include President Frank H. Newcomb, Secretary James A. Hemstreet, ex-President Louis T. Weiss, Charles Herrmann, Herbert G. Andrews, Robert H. Breninger, Arthur E. Beggs and Albert W. Seamon.

UTAH.

The phenomenal growth of the Utah State Automobile Association has necessitated an increase in the managing staff, the work getting quite beyond the possibilities of the present office force and Secretary W. D. Rishel. At a recent meeting it was decided to add new members to the force, and Capt. T. DeWitt Foster, who returned from France at the head of A battery, 145th artillery, was selected as office manager, and J. B. Bell was appointed membership manager.

Raps N. J. Roads

A severe criticism of the condition of the Newark Turnpike, one of the most accessible thoroughfares for New York motorists to reach Newark, is made by the chief roadman of the Automobile Club of America in a recent statement of road conditions in adjacent localities of New Jersey.

"If this turnpike were even in fair shape," he says, "it would relieve a considerable amount of traffic on the Hudson County Boulevard between Newark and Communipaw avenues and give the motorist a better way to go through Newark than via the Plank road. It is rather difficult to understand why the city officials, the Chamber of Commerce and other organizations can allow the Newark Turnpike to remain in the atrocious condition it has been in for the last five years, compelling the motorist to go over the Plank road, then through a congested section with narrow cobble stone streets, double trolley tracks, and after school hours thousands of children are darting across the street in all directions, which gives the motorist a very bad impression of Newark. The Automobile Club of America is receiving inquiries asking how can one get to Atlantic City or Philadelphia without going through Newark."

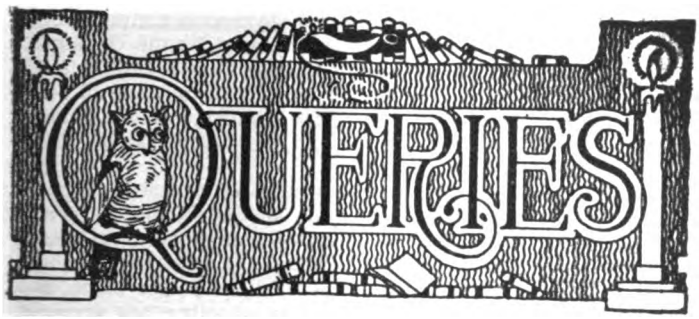
On the other hand, Broad street is a wide, well paved street, and the logical way to go through Newark is via Bridge and Broad streets.

Escaping Rough Stretch.

Tourists are informed that the rough stretch on the Hudson County Boulevard south of Newark avenue is being prepared for a new top dressing. Motorists can run parallel to the boulevard by turning into Summit avenue at Summit avenue station, which is followed into Bergen avenue, then a right turn into Jewett street and back to the boulevard. The boulevard is over 12 miles long and 100 feet wide, and is one of the most costly roads in the United States to maintain and keep in good condition, due to the enormous amount of heavy traffic.

All the roads to the South New Jersey resorts are in good condition; also the road between Keyport and Lakewood, excepting one or two short stretches near Matawan. The new concrete road which was finished last fall between Wicktaunk and Freehold is in fine condition. There is a short section under construction near Red Bank. Road work is going on between Philadelphia and Atlantic City on the road running through Hammonton.

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ATTACHING SIGHT FEED OILER.

(W. C. S., Schenectady, N. Y.)

Kindly give me a method of attaching a sight feed oiler to a Buick B-4-35-1917 car? Also state if it would be advisable to attach one.

You may connect the instrument in one of two ways. On the generator side of your engine on the lower part of the base you will find two plugs exactly alike, one above the other, with oil pipes leading from them to the oil pump located just forward on the upper part of the base with a continuation of one of the pipes still higher to the top of the timing gear case. The course of the oil is at present as shown in cut No. 3. Oil is taken from the base at point A, drawn to the pump, forced back into connection B on the outer end of the pump cylinder. Here the oil divides, part of it going to point C on top of timing gear case, the remainder being returned to the upper level of the base at point D. This oil is used in the troughs under connecting rods. One way to change the system and put in an oil gauge would be to disconnect the suction oil pipe at point A. Disconnect the ends of this pipe by unsoldering, if soldered, or turning it off the threads if threaded. This connection is to be used on the end of a new pipe to oil sight feed F on the dash, fasten connection into the side of the base from which it came. Lead the second pipe from the sight back to the loose end of pipe G which you previously unsoldered. By means of a threaded connection or a piece of larger tubing slipped over the ends and sweated on these two ends may be joined. This will allow the oil to be drawn from the base through the sight feed F to the pump, then returned in the usual manner, part to the timing gears C and part to the upper level of base—sketch No. 1. Still another way would be to disconnect the oil pipe at point B, unsoldering the pipe from the connection, and replacing this connection with a T. By leading an oil pipe from the outer end of your pump E to dash, to sight feed F and returning it to the T, at B making your connection to the T at B, by soldering or otherwise, care being taken to have these joints tight. The oil then will follow A to E at pump, E to sight feed F on dash. F to the T at B. Here it will divide in the usual manner, part going to timing gears C and part to base. You will find that either plan will meet your needs satisfactorily.

RECHARGING FORD MAGNETOS.

(E. S. P., Fresno, Cal.)

Kindly tell me through the columns of the Automobile Journal how to recharge the magneto of a Ford engine. I have a Ford car and as the magnets are weak I wish to recharge them.

The usual and best restoration when magnets are weak is to replace them with new ones. The Ford company does not advise everyone to attempt this work, which necessitates taking down the engine and reassembling it. This is a big and costly job. For this reason different methods will be stated to recharge magnets without removing them from the car.

Charging with storage batteries: Five or six six-volt storage batteries should be about right. See Fig. 1. To prepare the magneto for recharging first disconnect the wire (A) which goes from the magneto terminal on the transmission cover to the coil on the dash. Next remove the transmission cover (B) so you can look at the magneto. Locate the brass studs on the rim of the flywheel which hold the magnets in place, and have some one turn over the engine very slowly until one of these brass studs is in line with an imaginary line drawn about one inch or so from the magneto terminal, to the left of the latter and parallel to the frame. Another way is to place an ordinary small compass on the transmission cover about one inch from and to the left of the magneto terminal, at the same time turning the engine slowly until the needle of the instrument is parallel with the engine. The north pole of the needle should point towards the engine when in this position.

Connections: Connect a wire from the positive (+) terminal of the battery to the magneto terminal on the engine, as shown at (C). Next connect a wire from the negative (—) terminal on battery and make and break the circuit by striking the free end of the wire on some metal part of the engine.

Permanent connection should not be made, but only 30 or so momentary contacts, which, it is said, will recharge the magnets much more satisfactorily than if permanent contact is made.

Other sources of electric supply for charging the magnets are described and shown in the cuts. Direct current, 110 volts, may be used for this purpose, and if resistance wire is used the following will be required: 13 feet nichrome No. 16 wire, or eight feet of No. 18. If German silver, use 35 feet No. 16 or 22 feet No. 18. To use it will be necessary to use a resistance lamp back, Fig. 3. Use 28-32 candlepower carbon filament lamps. Connect the positive pole with the magneto terminal. Connected as shown gives 27½ volts.

It is necessary to know the positive (+) and negative (—) pole of a battery when charging. Pole finding paper can be secured which will show one color for negative and another for positive. The skin of a potato will show polarity if wires are held on it and the positive contacts will show a green color. Other methods are shown at Fig. 5, but Fig. 4 and D and B are the simplest.

When low voltage is used the wires should be close, but not touching. If 110 volt, ½ or ¾ inch apart. Fig. 4 is self explanatory, if a suitable voltmeter is not at hand, dip the ends of two wires into a glass of water in which a teaspoonful of salt has been dissolved, care being taken to keep the wires at least an inch apart.

When the current is turned on the greatest number of small bubbles of gas will be given off from the negative wire.

WIRING A SPOTLIGHT FOR A FORD CHASSIS.

(A. D. S., Belchertown, Mass.)

Will you supply a wiring diagram for a 1918 Ford for a spotlight and two side lights so that I can turn a switch and cut out the headlights? Also advise as to what size lamps to use?

The two diagrams here shown will easily explain how this may be done. Fig. A shows the original Ford wiring diagram. Fig. B illustrates how without changing this plan, wiring may be run to the side lights and spotlight. A two-point switch is all that is needed outside of the extra wire and the lamp sockets. The magneto in the 1918 and 1919 Ford cars is rated at 18 volts; the earlier cars were rated at 14 to 16 volts.

With the 18 volt current to work with the wires are run to the headlights and are connected to them in series, the voltage of each head light bulb being one-half of 18 or 9 volts. The current passes from the switch on the dash to the headlight on the right, then through the lamp to the headlight on the left, passing through that lamp and then to the ground on the side of the frame. This is shown in Fig. A.

Fig. B shows the changes to be made. From point 2 on the two-way switch a wire runs from the right dash and from this lamp it is carried to the left dash lamp and thence to a ground on the car frame. A second wire starts at the point No. 3 back of the switch and goes to the spotlight, thence to a ground on the frame.

In the dash lamps use bulbs of two or four candle power, nine volts, as your lamps are still in series, your magneto voltage being 18 volts.

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In the spotlight you will have to use a lamp of 16 or 18 volts and 21 candlepower. This will allow the use of the spotlight independently, turning it off and on at the back. Another way would be to wire the three lights in series as in Fig. C, using six volt lamps for all three, the dash lamps to be two candlepower and the spotlight about 20 candlepower. In this last case the three lights would all have to burn at the same time—that is, you could not throw off the spotlight without damaging the dash lamps.

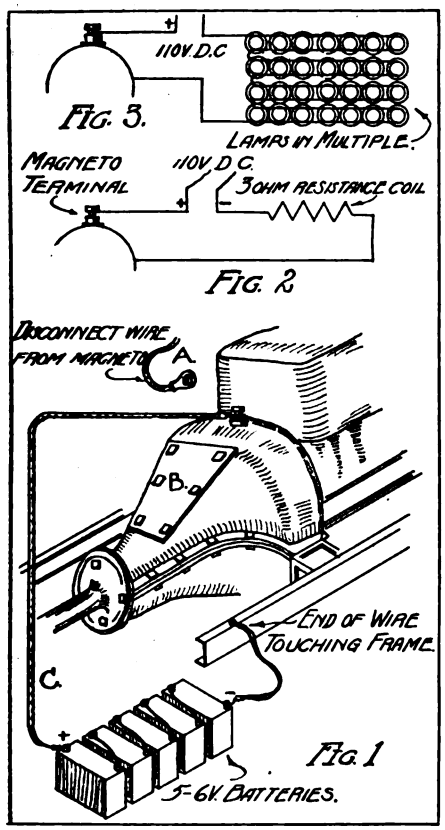
CAR DOES NOT DEVELOP POWER.

(J. E. C., Ashland, Ky.)

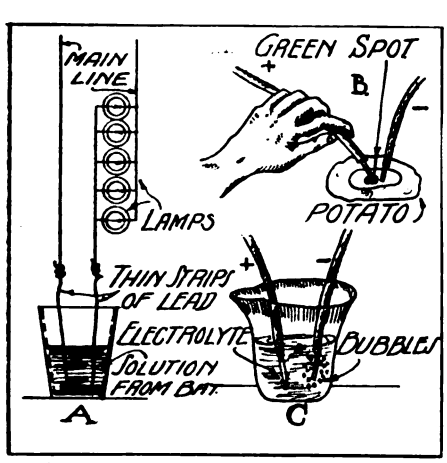
Kindly tell me through the columns of the Automobile Journal how my 1912 Oakland 40 is wired, also please show diagram. This car will not give the power I think it should. I have been told that this model never did develop power enough for hills. Do you know anything about it?

This diagram is shown in Fig. A and B. We do not find that the Oakland Car Co. manufactured a car in 1912 with an electric starting and lighting system, so assume that your car is equipped with a low-tension magneto with a single coil box on the dash. The first car manufactured by the Oakland company with starter and lighting system was in 1913, when they came out with three models known as models 35, 42 and 60. The model 35 had the Deaco system with an Exide battery and the models 42 and 60 had the Delco system with Exide battery.

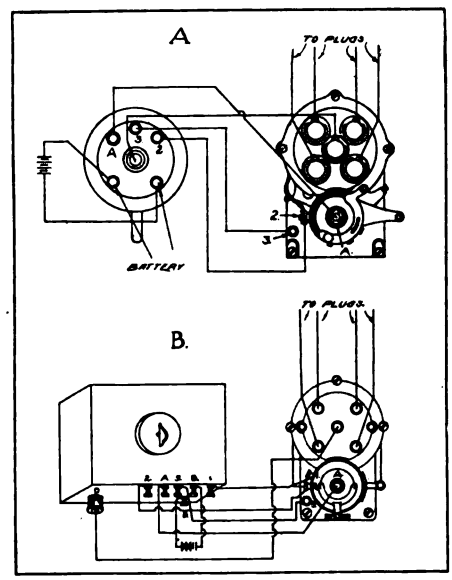
As to the power of your car we would say that as this car actually develops 27.3 horsepower you should be able to have plenty of power for hill work, but when one takes into consideration that this car is seven years old and that during that time a great many improvements have taken place in car construction and at the same time gasoline has grown poorer in quality, it is no wonder that your car does not pull as good as formerly. It is possible that your valves may need grinding and the carbon removed. A new carburetor with one of the many stove attachments for warming the air going to the carburetor would help considerable. This is necessary today, although it was not in 1912.



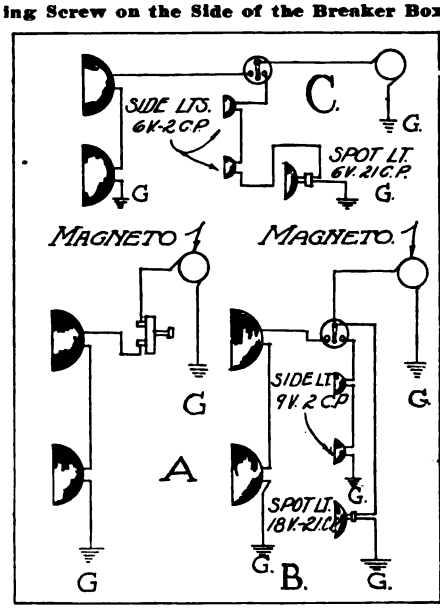
Recharging Ford Magnetos—Fig. 1, Charging from 5 6-Volt Storage Batteries Connected in Series. Fig. 2, Charging from City Mains at 110 Volts. Fig. 3, Charging from City Mains with Lamp Bank Resistance.



Testing for Polarity, A, by Means of a Glass of Water; B, the Skin of a Potato; C, Water with a Teasponful of Salt Dissolved In It.



Wiring Diagram of 1912 Oakland Car: A, Connections from the Switch to the Starting Battery; A Connects from the Switch to the Roller of the Timer at the Cap on the End; No. 3 Wire the Switch to the Binding Post on the Side of the Magneto; No. 2 Wire Connects the Switch to the Adjusting Screw on the Side of the Breaker Box.



Wiring Spotlight on a Ford Car: A, Shows the Regular Ford Circuit Using the Regular Ford Magneto; B, Shows How This May Be Changed by Means of a Switch, Using Two Side Lights and a Spotlight of 18 Volts 21 C. P.; C, Shows How to Wire in the Spotlight Using a 6-Volt 21 C. P. Bulb.

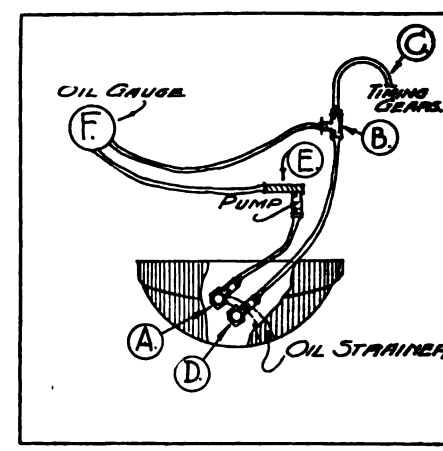


Fig. 1, Method of Piping Oil to the Dash Oil Gauge.

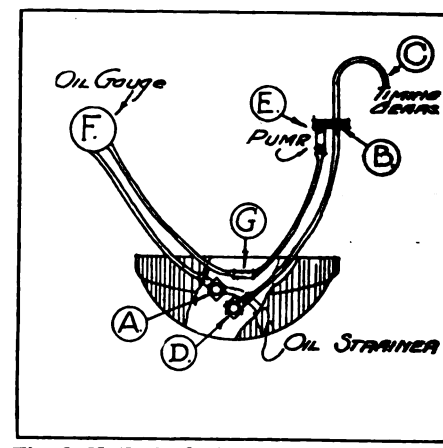


Fig. 2, Method of Piping the Oil to the Oil Gauge Before It Is Pumped.

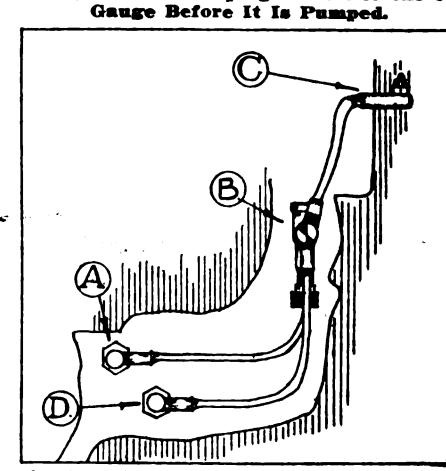


Fig. 3—Original Method of Oil Circulation on a Buick 4-35 of 1917.

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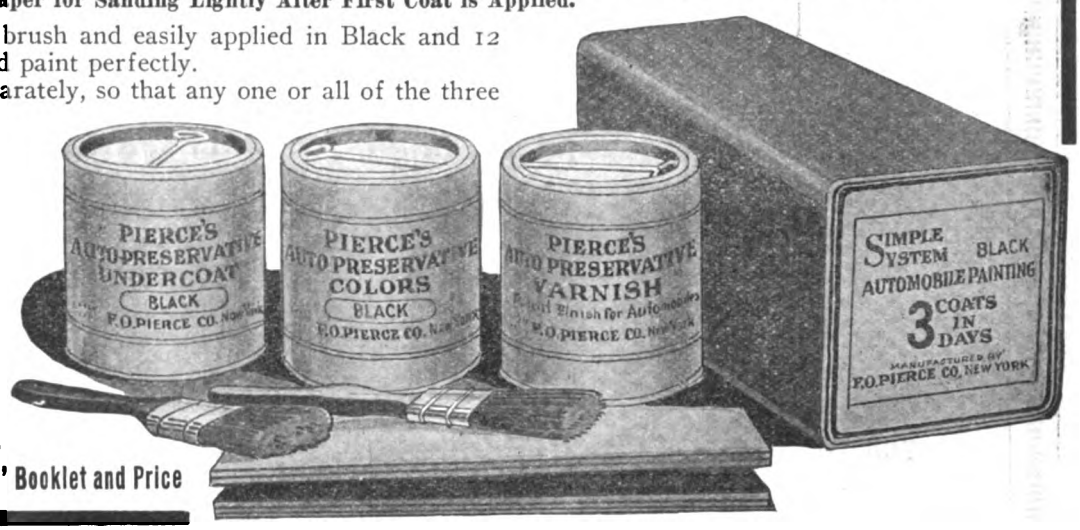
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Write for "Simple System" Booklet and Price

PETCOCK OPENER.

It is almost impossible to turn the petcocks on the lower half of the Ford crank case without the operator soiling his hands and clothing. A simple device to remedy this condition is illustrated in Fig. A. It consists of a two-foot piece of quarter-inch wire. The part which turns the petcock valve is a piece of sheet steel bent in U shape, as shown with a hole drilled in its center. It is then riveted and pinned on the end of the wire. The other end of the wire is bent to form a handle. If desired the wire at this end may be divided off into inches for measuring the gasoline supply.

INSTALLING VAPORIZING EQUIPMENT.

(G. F. R., Perth Amboy, N. J.)

Am interested in installing a moisture accessory device on my eight-passenger 1917 model ——— car. Am considering one or two types.

1. A tank containing water connected direct to the intake manifold, supplying constantly a small amount of moisture.

2. The same type tank, but the feed pipe passing several times around the exhaust pipe, forming coil in which water will be turned to steam, before reaching intake manifold.

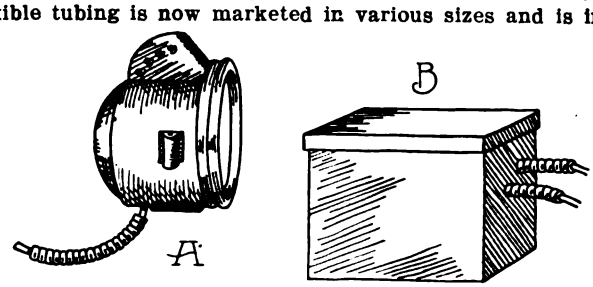
Both are represented as carbon removers to give increased power and save fuel. Kindly advise me which type is the best.

Would say that in all of these devices on the market the principle is the same. That is the introduction of water or steam in small volume into the intake manifold, thence into the combustion chamber of the engine. The principle is that hot steam or water entering the cylinders, coming in contact with the carbon, a chemical action takes place, breaking up the carbon into small particles from the pistons, valves and head so that it may be exhausted. The claims made for these devices are more miles per gallon of fuel, carbon removed, clean spark plugs and a smooth running engine. Without being impartial we would say that the types having the feed pipe wrapped several times around the exhaust pipe, thereby turning the water to steam, would probably give good results with your engine. The Oxy-Generator Co, 1919 South Michigan Ave., Chicago, Ill., manufacture one of this type. Still another with dash board control is made by the Water Gas Carburetor Co., Kansas City, Mo., or Fifth Ave., N. Y.

We do not believe that you would make any material gain in fuel question, still with the carbon removed it probably would make some difference. As to using kerosene instead of water we would not recommend it. As a small amount of kerosene would be mixing with your gas at all times and as kerosene is less volatile than gasoline, they would not vaporize alike and trouble would arise. Dry steam will do the work better and with less complication.

LIFE OF WIRING, GAS TUBING, ETC., INCREASED.

All accessories of a car that are subject to wear can be greatly reduced. The life of the wiring, gas tubing, etc., can be increased at slight expense and little trouble. Metallic flexible tubing is now marketed in various sizes and is inexpensive. If a small piece of this was placed over the rubber tubing leading to the gas lights, as shown in Fig. A, the rubber would not be subject to the weather and could not kink, a trouble frequently met with. At Fig. B is shown a method of preserving the insulation on the wires leading from the battery. Pieces of tubing are inserted in holes in the battery box and the wires passed through them.



A, Protecting Rubber Pipe with Flexible Metal Tube; B, Armoring Electric Cable at Battery Box.

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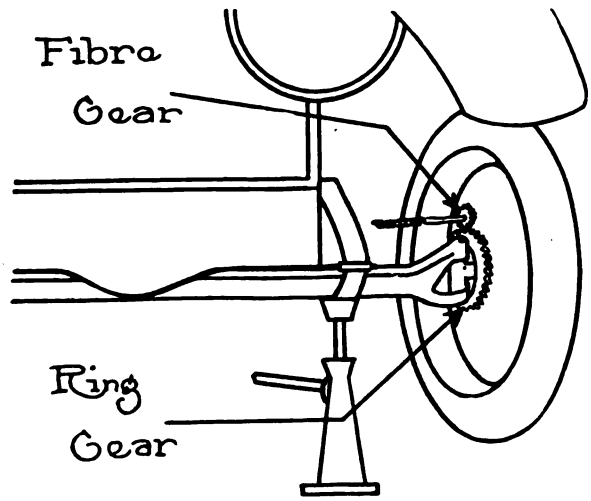
708 BEACON STREET, BOSTON, MASS.

COOLING SYSTEM.

(I. M. T., Hagerstown, Md.)

I have been told that a solution of soda and water is good for cleaning out the cooling system. What proportion of soda and water should be used, and how should the solution be put in the system?

A great many motorists and mechanics advocate the use of the soda and water solution for the purpose you mention. A half pound of soda should be thoroughly dissolved in five gallons of water and carefully strained. Before pouring it into the radiator and cooling line, drain the system thoroughly. With the mixture in the system run the motor for a few minutes and then drain. Next flush the system with clear water and again run the motor. When this has been drained out the system should be as clean as is possible with such a mixture.



How Speedometer Fiber Gear Meshes with the Ring Gear.

BATTERY CHARGING EQUIPMENT.

(H. J. S., Richland, Pa.)

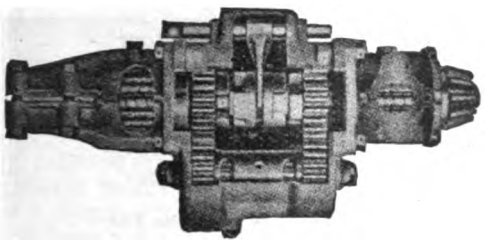
Do you think a motor generator outfit would be more reliable for charging from one to four storage batteries than a rectifier would be? The current available is 220 volts, alternating. Please advise me what you know about the Rollinson rectifier which has been recommended to me, giving the address if you think it reliable and the price reasonable.

A number of reliable and dependable charging outfits are sold commercially and from these you can undoubtedly obtain what will meet your requirements. As you have alternating current of 220 volts you may prefer to transform this mechanically to a lower voltage, nearer to what would be ordinarily required for charging. Several chargers that are driven by gas engines and are very practical are obtainable, but we assume that this type will not interest you. The Stahl Rectifier Co., 1401-5 West Jackson boulevard, Chicago, Ill., produce a rectifier that is regarded as entirely dependable. It differs from the motor generator type and is claimed to convert 90 per cent. of the alternating current into direct current. The power required to drive the small synchronized motor is from ⅛ to ¼ horsepower. Anyone can connect, start and stop it, and it requires very little care aside from keeping it lubricated, and the commutator cleaned. Another motor generator that is claimed to be very efficient and satisfactory is built by Hobart Bros. Co., Troy, N. Y. This can be driven by alternating current taken from the city mains at standard voltage. The shaft of the motor generator is carried on ball bearings at either end. This outfit includes a switchboard ready for connection. The control is automatic and different batteries can be charged at the same time. If the batteries are connected in reverse, the negative pole to the positive terminal of the charger, the generator will reverse its polarity and the battery will not be damaged.

We do not have record of the Rollinson rectifier.

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The plug that burns all carbon deposit and that has never failed to meet every service test. The sharp edges of the insulators as shown by the arrow in illustration become very hot and burn the carbon. The one positive way to eliminate carbon. It cannot easily carbonize, crack or break. It adds to engine power and reliability. Saves gas and oil and eliminates all the usual plug troubles. No gaskets are used. No cleaning required. - - - A size for every motor.

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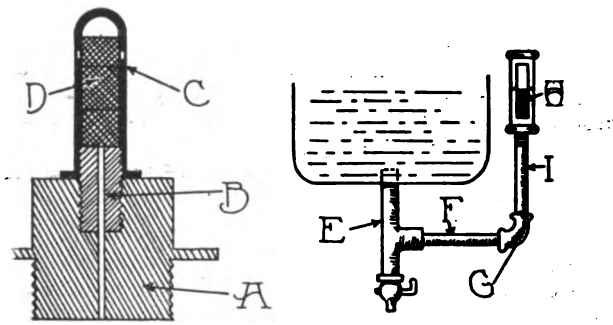
HOME-MADE ENGINE OIL GAUGE.

Engines of earlier designs are not always equipped with indicators or gauges to show the quantity of oil in the crank case or reservoirs. An easily constructed indicator is shown in illustration. Usually the case will have a petcock at the base for draining it and this should be removed and a T fitted in the openings as at E. Screw a short pipe into the T as at F and at the free end fit an elbow, G. A small glass gauge, H, can be obtained at any hardware store and this should be attached to the elbow by a short pipe, I.

A short piece should be tried at first and oil placed into the crank case until the engine emits a smoky exhaust. The oil should then be gradually drained until the smoking ceases. This is the correct oil level. A pipe should now be fitted that is of the proper length to allow the oil to appear about an inch from the top of the gauge. The point can be marked on the gauge and the driver can always determine the quantity of lubricant that is in the crank case. A petcock can be fitted to the free end of the T for draining purposes.

REAR AXLE HOUSING RELEASE.

When the felt packing washers or gaskets are worn grease will work out of axle housings and on to the rear wheels. But grease on the wheels is not always a result of the wear or hardening of the felt washers. Experiments have proven that expansion of air in the differential housing may cause sufficient pressure to force lubricant past the washers. Such leakage can be stopped by attaching a vent to the filler cap, as shown in Fig. A. This is only advisable when the cap is located on one side of the housing and not in the center, directly over the ring gear. Obtain an old valve stem, as shown at B, and cut off a piece of about one inch in length. Next drill and tap the cap so as to admit the stem. It is advisable to lightly solder the stem to the cap so that it cannot work loose and fall into the housing. Obtain an ordinary dust cap and drill three small holes at the top as at C and then insert



A, Device for Reducing Pressure in Differential Housing; E, Oil Gauge for Old Type Motor Crank Cases.

a fine brass screen, as shown at D, and screw the cap tightly on the valve stem. The screen will prevent dirt or foreign matter entering the housing, but does permit equalization of the air pressure.

CAUSE OF CARBON KNOCK.

(D. T. L., Syracuse, N. Y.)

I am anxious to know how carbon can cause a knock. I will appreciate any information you can give on the subject. I have asked many, but do not seem to get a good answer.

Carbon, accumulating in the head of the cylinder, becomes incandescent and ignites the explosive mixture before the end of the compression stroke. The explosion force is exerted on the piston as it is coming up, checking its movement and driving the piston against the wristpin and the connecting rod against the crankshaft, causing a knock. If the blow comes after dead center the piston will have a regular impulse, turning the engine normally. This occurs when the engine runs with the switch off. But if it occurs before dead center it tends to push the piston down, giving the characteristic carbon knock.

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NOISE IN TRANSMISSION CASE.

(H. C. C., Marlboro, N. Y.)

I have a 1916 ——— which has always been very noisy when pulling up hill on second speed, making a loud metallic roar which seems to be in the transmission. Can you suggest a remedy? Part of the gears were quite badly worn, due to ignorance in changing gears, and they were replaced, but it did not obviate the noise I speak of. What is your opinion as between a four and a six-cylinder car for pleasure riding in a hilly country?

There are two probable causes for the noise if you are positive that it is caused in the transmission case. You say you have had a part of the gears replaced with new. Necessarily you examined the bearings on each end of the shaft before putting the shaft and gears in place again. But seemingly you did not examine the gears or the bushings of the lower shaft and here is where you will probably find the trouble. If the bushings that support this shaft are worn this can be learned without taking the shaft out of the case by removing the cover and drawing out the oil. Or, if you do not mind oil on the hand, slip a hand into the gear box and grasp the shaft. If the bearing is worn you can move the shaft more or less. If play is found the only repair is a new pair of bushings. It may be that the gears are worn as badly as were those on the upper shaft. In this case, either new gears should be put on the shaft or the old gears may be repaired by filing if they are only burred on the teeth ends. New gears marked with old gears would cause such a noise or roar you speak of. If none of these conditions exist you should look for the cause in the rear system. Sometimes a noise will seemingly be caused by a certain part when in reality it results from a part adjoining.

You will be well pleased with a six-cylinder car in a hilly country, if you have been driving the four-cylinder car you mention, you must have a knowledge of the possibilities of that type. You will probably find that a six will not be quite as economical as a four, but on the other hand the six will be a much easier riding car on account of its longer wheelbase.

LAMP CIRCUIT IS DEFECTIVE.

(W. V. O., Litchfield, N. D.)

The bulbs on my 1915 Buick have burned out. What can I do for this?

The first thing to do is to put in new bulbs, but this will not end your trouble unless you find the cause and remedy it. Put in the new bulbs and try the lights. If your circuit breaker, mounted on the back of the dash, sets up a chattering sound, you can be sure that you have a short circuit somewhere on your light wire circuit. This wire should be traced through, beginning back of the ignition and lighting switch on the dash. Take out the screws that hold this block to the dash and pull this block towards you as far as the wires will allow. This will give you a chance for a close inspection of the wires. Look for loose connections or crossed wires. If the trouble is here this is what it is most liable to be. Follow the wire on down to where it enters the tubing, noticing whether the insulation is worn off and whether it touches the metal parts of the dash. There is a remote possibility that this wire may be grounded in the tubing,. If you wish to be sure of this you had better pull the wire out of the tubing, but it is more probable that your trouble is further along where the wire comes out of the tubing and passes along the frame and goes to the lamps. Possibly it is here that you will find the cause of your trouble, if the wire is chafed or the insulation is worn so that the wire rests on the frame between the end of the tubing and the lamps. If you locate the trouble here, it is the reason of your lights not burning. Examine the plug that leads the wire into the lamp. Some times in making this connection one of the strands of wire is left hanging loose and is just long enough to make contact on the side of the socket, causing a short circuit.

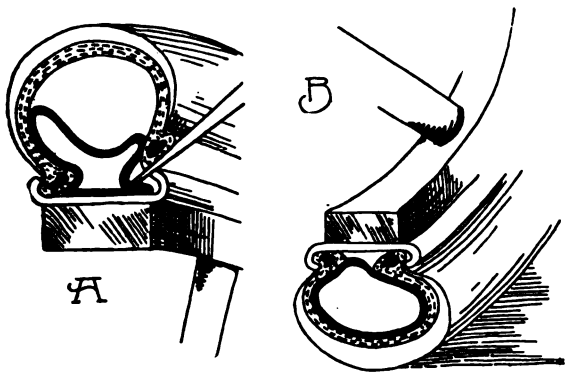
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PNEUMATIC TIRES.

(H. P. B., Columbus, O.)

Why is it necessary to inflate the tires to the manufacturers' schedule so that they ride almost like solid tires? I have never inflated the tires on my ——— car to the required pressure, yet I have received good mileage. Can you explain what causes the tube to pinch in the shoe when mounting?

If you have used tires which were underinflated and yet have received good mileage, you are to be congratulated more for your luck than good judgment. With the tire well inflated there may be a little comfort sacrificed, but this is over balanced by the other results obtained. It may be stated that it requires less power to drive a well inflated tire than it does a soft one. As an example of this, did you ever ride a bicycle the tires of which were soft and then inflate the same to standard? It required less effort to propel the vehicle when the tires were "hard" than it did when they were soft. The plies of friction fabric form the basis of the



Sketches Illustrating How Inner Tubes Become Pinched and Ruined.

tire. When the tire is under inflated, these plies are permitted to stretch and consequently loosen. Of course this cannot be noticed from the exterior. A tire in this condition is also subject to stone bruises. The accompanying illustration B shows the possible action of an under inflated shoe when turning a corner, which causes the fabric to stretch and the bead to pinch the tube. Pinching the tube when mounting is mostly due to the tube being caught beneath the tire bead, as shown at A. Many times it is pinched by the tire iron. When mounting a tire the tube should be slightly inflated so that it completely fills the shoe.

NECESSITY OF FLYWHEEL.

(G. T. T., Highland Park, N. J.)

Why is a flywheel used on an eight or 12-cylinder engine? I can understand the need of one on an engine of only one cylinder, as there is a long interval between power strokes, but where the strokes overlap I should think the flywheel would be unnecessary.

The flywheel is needed to absorb the impulses of the power strokes and so give a smoother running engine. The gas engine is driven by a series of heavy shocks on the pistons that are communicated to the crankshaft. These would cause excessive vibration, be more or less destructive of the power transmission and would cause great discomfort for passengers. The flywheel absorbs the forces of the explosion because of its inertia and stores energy that causes it to turn during the strokes when no power is exerted. It transforms the transmission of power from impulses into continuous and even power. The flywheel also serves when cranking to overcome the resistance of the compression stroke. When one or more cylinders miss explosions it tides over the "dead" period, just as it would on a single cylinder engine. The weight of the flywheel is decreased for multi-cylinder engines, indicating there is less need of strong energy to turn it, for the power strokes gradually overlap and there is more continuous application of power.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUG. 24, 1912, OF

AUTOMOBILE JOURNAL,
PUBLISHED MONTHLY AT PAWTUCKET R. I.
For May 1, 1919.

State of Rhode Island, County of Providence.

Before me, a Notary Public, in and for the state and county aforesaid, personally appeared William H. Black, who, having been duly sworn according to law, deposes and says that he is one of the owners of the Automobile Journal, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above captain, required by the act of Aug. 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business managers are:

PUBLISHER, WM. H. & D. O. BLACK...Pawtucket, R. I.
EDITOR, W. W. SCOTT.....Pawtucket, R. I.
MANAGING EDITOR, E. B. NORTON..Providence, R. I.

2. That the owners are:

WM. H. BLACK.....Pawtucket, R. I.
D. O. BLACK.....Pawtucket, R. I.

3. That the known bondholders, mortgagees and other security holders owning or holding one per cent. or more of total amount of bonds, mortgages or other securities are:

M. J. BLACK, Mortgagee.....Pawtucket, R. I.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association or corporation has any interest direct or indirect in the said stock, bonds or other securities than as so stated by him.

(Signed) WILLIAM H. BLACK, Co-Partner.

Sworn to and subscribed before me this 7th day of April, 1919.

(Signed) CHARLES McALEVY, Notary Public.
[Seal] (My commission expires June 30, 1920.)

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C. A. MINER, Managing Director.

HEAVY REPAIR BILLS.

(J. M. G., Fort Wayne, Ind.)

My 1916 Ford coupelet has run 13,500 miles. It had been run about 500 miles when I bought it. It has cost me $1606.76, or about 13 cents per mile. It is now in good shape and runs well, but one piston slaps. The head mechanic of my repair shop says it should be rebored, or have a new cylinder block, or trade the car off for a new one—in fact, seems indifferent about it.

I bought the car from them and spend hard earned money with them. The car was taken out and abused, without my knowledge, and I have paid like a game sport, several times, once $60. As far as I am concerned, I am not hard on it. The mechanic says larger rings would do no good. I am about through spending money on this car in large amounts. The car looks good, is good and suits me fine. How long would the engine last approximately, and what would be the consequences if I just let it "slap?"

When the mechanic said that larger piston rings would not eliminate piston slap, he told the truth—but it was one of those half truths that are sometimes deceiving. It is usual and good Ford repair shops practise to remedy piston slap by fitting oversize pistons. You will find oversize pistons listed in the Ford parts price list for this purpose. A new piston complete, oversize, now costs about $2. The labor charge for installing one new oversize piston should be $4.50. For installing two to four new pistons the labor charge should be $6.

A Ford motor usually requires to be fitted with a set of oversize pistons at the end of 10,000 to 15,000 miles of service. Then the motor should be good for from 8000 to 12,000 miles of use before the cylinder block will require reboring. Better have this reboring work done at a Ford repair shop, where they have the proper tools with which to do the work.

Then the engine will be better than new as far as it is concerned. If by chance oversize pistons have already been put into your engine you can easily tell the next time that you remove the cylinder head. These are marked .0025, plainly stamped on the piston head. We suggest that you examine the bills that you have received from time to time. These will give you some idea of the new parts that have been put into this car. If the bills show that new oversize pistons have been installed you can check this up for yourself and then you will have confidence in your repair man.

If your car has been taken out without your permission we would suggest that you get a good lock and use it—a chain and padlock if necessary. There is no reason why you should pay for joy riding by others.

A piston slap is very annoying to the driver of a car and if the engine is run many thousand miles in this condition it is probable that the cylinders will be worn oval in the walls to such an extent that even reboring would fail to restore efficiency.

To sum it all up, see if your engine has been fitted with oversize pistons. If not, install them. If it has, have your engine rebored, and do not let others drive your car and ruin it for you.

WASHING SODA FOR CLEANING RADIATOR.

(C. J. R., Rome, N. Y.)

I have been told that washing soda is the best means of cleaning out scale and other foreign matter from the cooling system of a car. I should think that it would have a very bad effect on the rubber hose connections, but if not, will you please tell me what proportion of soda to use for a water system with a capacity of five gallons?

Washing soda is excellent for this purpose and will not injure the hose connections for the short time that it is in the system. Make a saturated solution, that is, dissolve as much of the soda as the water will take. Put it in the system and run the engine 20 minutes. Let the soda water stand for 20 minutes more, then drain it and flush with clean water.

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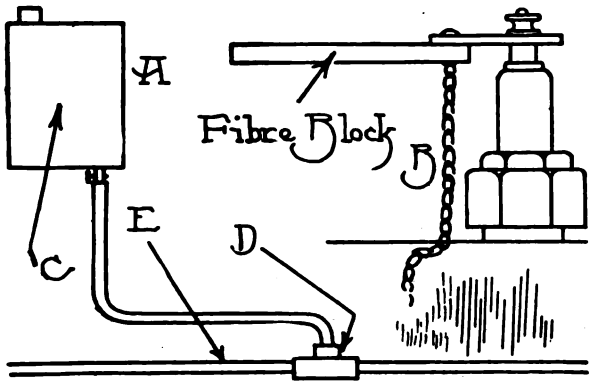
WANTS TO RESTORE CAR FINISH.

Kindly advise how and with what the surface of a car should be washed to retain the original gloss. Is there any substance which when applied brings back the gloss once it has disappeared?

No finish will withstand washing indefinitely. The harm is reduced by using a pure linseed oil soap. This may be dissolved in warm water, but only cold or cool water should be applied to the car varnish. Start by flowing the water over the parts of the car without a spray to remove the dirt and loose grit, applying the soapy water with a clean soft sponge afterwards. Dulling the finish is usually caused by wiping the dust off with a dry cloth, which grinds the dirt into the varnish. Sometimes it is also caused by using some one of the many body polishes that are on the market. Buy a "body dressing" containing paraffin from a reliable dealer. This will help to restore some of the luster on the body of your car.

SPARK PLUG CUT OUT.

If care is not taken the operator is apt to receive a shock when short circuiting the spark plugs with a screw driver. A better and more convenient method is illustrated in Fig. B.



A, Approximate Proportions and Design of Emergency Tank Suggested; B, a Simple but Practical Spark Plug Cut Out.

It consists of a small fiber block, a short length of chain, a strip of sheet metal and a small stove bolt. The strip of sheet metal is placed on top of the block and the chain at the bottom and both are held together by the small stove bolt. The operation is simple. Let the piece of sheet metal contact with the spark plug and the chain touch the cylinder or any other convenient metal part. This is an easy method of locating missing plugs.

ENGINE DOES NOT ACCELERATE.

(B. R. M., Portsmouth, N. H.)

When I press the accelerator on my Buick car the engine does not always respond. At such times there is a hissing or sucking sound that seems to come from some part of the exhaust manifold. This trouble only happens at times. The vacuum system seems to work properly as there is always plenty of gasoline at the carburetor. What do you believe the cause is?

The noise that you speak of is probably the air being drawn in around the hot air intake at the exhaust. The spring of the air valve may be too tight, causing the shutter to open too late. Or dust may have gotten into the tip end of the needle valve, partially stopping the flow of gas. Or you may find that dirt and lint has collected at the end of the feed pipe on the top of the vacuum tank.

A strainer is placed there to collect this lint and dirt and by disconnecting the union that holds this feed pipe in place the strainer may be taken out and cleaned. Even though the carburetor was filled with gas the only time that you could see this would be when the engine was stopped and gas enough would get by the strainer to show this. Think that cleaning out this strainer will cure your trouble.



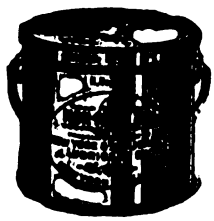
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ENGINE CHOKES AND BACK FIRES.

(L. C., Boston, Mass.)

I have a six-cylinder 1916 model ——— car which is giving considerable trouble. It misses and back fires till the engine stops. When going up hill it chokes so that I can scarcely make a hill on second speed, that I formerly made on high. It runs fine on level ground for about 20 miles, then if I put on more gas it will skip and jerk. I have had the valves ground, but that did not help. The garage man said that the timer is all right. What can you suggest?

Your trouble is apparently at the carburetor. Either your mixture is too lean or too rich. If too rich, you will notice a strong smell of the gas mixture at the back of your car when the engine is running idle. This comes from your muffler.

If too lean, your car will run all right on the level, but as soon as you come to a hill you will find that your car will refuse to pull.

Either of these troubes may be corrected by properly adjusting the carburetor, the directions for which follow for the Marvel carburetor used on your model car:

1. Turn the gasoline adjustment to the right until the needle valve is completely closed.
2. Set the air adjusting screw so that the end of screw is even with the point of the ratchet spring just above it.
3. Open the gasoline adjustment by giving the needle valve one full turn.
4. Start the motor as usual; allowing it to run a few minutes with the air regulator turned to "Hot," until the motor is thoroughly warmed.
5. With the spark lever fully retarded, turn the gasoline adjustment to the right, closing the needle valve until the motor idles smoothly.

To test the adjustment, leave the spark lever advanced and open the throttle quickly. The motor should accelerate instantly. If it skips or pops back, open the gasoline adjustment slightly by turning the needle valve to the left.

Do not touch the air adjustment again unless it appears absolutely necessary. The best possible adjustment has been secured when the gasoline adjustment is turned as far as possible to the right, and the air adjustment is turned to the left as far as possible, letting the motor idle smoothly and accelerate quickly when throttle is opened.

Try out your car after setting the carburetor according to these instructions. If your trouble is still present, look over your wiring carefully, especially the lead wires to your plugs, running from your distributor. See that the insulation is not cracked or broken, or that the wires do not touch the metal of the cylinder heads. Look over your plugs to see that the porcelains are not cracked; that the spark gap is not too wide —this should be the thickness of a worn dime—and that your spark plugs are not fouled with carbon.

This should remedy your trouble. If it does not, look at the timer points where the current is interrupted. Possibly these need a closer setting.

This is found just below the distributor. Loosen the catches that hold the distributor, lift it off, and you will see this timing case with the timing points at one side of the center.

Adjust these points so that when the fiber block on the contact arm is on the highest part of the breaker cam the contacts are apart the thickness of the gauge on the distributor wrench marked "distributor," or, on some of the older distribuor wrenches, the gauge is marked "for steel cam distributor." This is .018 of an inch.

PROPER AMOUNT OF AIR TO GASOLINE.

(G. H. M., Richmond, Ind.)

What proportion of air to gasoline is used in the fuel mixture of present day automobiles?

The modern engine will consume fuel having from eight to 14 parts of air to one part gasoline. The common mistake is to get the mixture too rich. The mixture ought to have as near 14 parts air to one of gasoline as is practical to obtain.

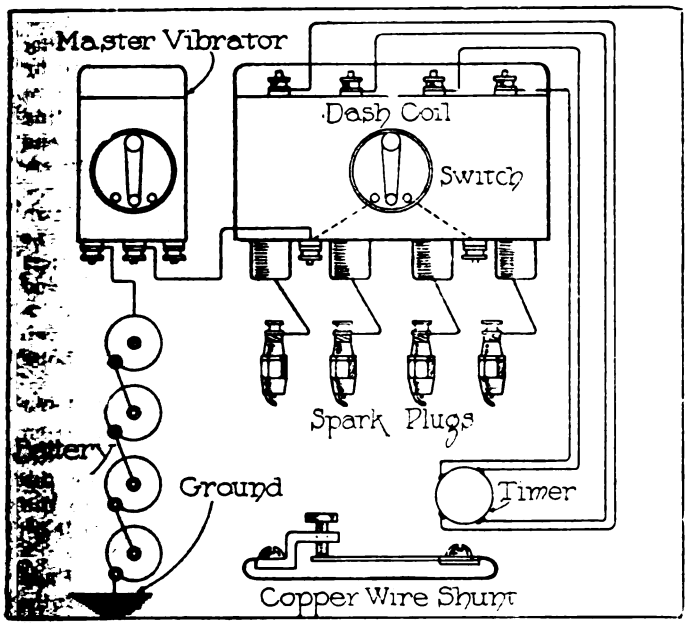
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MASTER VIBRATOR FOR FORD CAR.

(A. J. B., Alliston, Mass.)

My 1915 Ford car causes me considerable trouble in the ignition, the vibrators on the coils stick after running a few days. Sometimes it is one vibrator and then another and I cannot understand the reason for it. Have put in new vibrator springs, but they soon develop the same trouble. Can you tell me the reason of it, if it can be prevented and if so how this may be done?

Your trouble is probably caused by setting the vibrator springs too close. They require a very light setting, just enough to do the work and no more. As this trouble is serious would advise you to put on a master vibrator. This vibrator, when connected, will take the place of the four coils now on your car. The only change necessary on the four coils is to fasten the vibrators with a small piece of wood similar to a match.



Connect the center binding post of the master vibrator with the left binding post of the four section coil as shown on the diagram. The left binding post of the master vibrator is to be connected to a battery of four dry cells in series, the other end of dry cells to be grounded to the car frame at some convenient point. The right binding post of the master vibrator is to be connected to the plug on the magneto. The master vibrator will do the work of four coils with only one vibrator to care for.

DIFFICULTY IN STARTING FORD.

(A. B. J., Palmer, Mass.)

After my Ford car stands over night, or after eight or 10 hours, I can only get it started by jacking the rear wheels or by pushing the car down a grade. After it is started I have no further trouble. What is the cause?

From the description of your trouble would say that there is probably some end play on the shaft on which the magnets are carried. The faces of the magnets are separated from the surface of the coil spools 1/32 of an inch. There may be play enough so that when the car stops there is not sufficient intensity of current to ignite the charge.

This trouble might also be found in the timer. During cold weather the oil hardens to some extent. This prevents the roller from making contact and consequently makes starting difficult. Clean out the timer and supply a little oil mixed with kerosene to make the oil thin.

The magneto contact may be the cause. Take out this plug and clean it. Lint from the transmission band and sediment from the oil collect on it and will sometimes completely prevent a flow of current.

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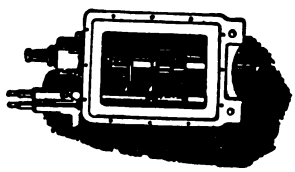
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Service



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REMOVING BUICK ENGINE FROM CHASSIS.

(H. F., Poughkeepsie, N. Y.)

I want to take the engine out of my Buick car to overhaul it. Would like to know if after taking out the four bolts holding it to the frame the engine can be moved forward by releasing the clutch? In other words, is there anything else that holds the engine? The car is a 1917 6-45 model D.

After draining the water from the cooling system, loosen the hose connections at the top and bottom of the radiator. The brace rod that holds the radiator rigid to the dash is unbolted and the rod turned out, and then the bolts holding the radiator to the chassis are taken out, after which the radiator is taken off and placed flat upon the work bench. The water manifold is next removed and all wires and cable connections taken off or tied back on the dash out of the way. These should be properly tagged to assure accurate replacement as originally connected.

The Stewart vacuum tank is next removed by uncoupling the vent tube, the suction tube to the intake manifold and, lastly, the gasoline line connection leading back to the gasoline tank. This assembly should be laid aside, care being taken not to bend or otherwise damage the copper tubing by accidental contact. The fan is supported by a swinging arm held by a bolt and the tension maintained by an adjusting nut. Release of this nut allows the fan to become loose and removal of the bolt permits the fan to be taken from the engine. To remove the generator take out the bolts at the base of the generator and those at the rear, which clamp down the cover of the starter gear case. Drive out the pin at the front end of the generator shaft and the generator upon which the coil is secured may be removed. The intake and exhaust manifold, together with the carburetor assembly, is clamped to the engine by three arms, each containing two bolts. Removal of the heating tube and the six arm bolts will permit the removal of these parts.

Remove the oil inlet pipe from the dash to the left hand side of the motor and disconnect all dash apparatus from the engine. Unbolt the foot pedals and slip them off. Remove the gear shift and emergency brake and uncouple the universal joint. When the bolts that hold the engine to the chassis are removed the engine and transmission unit will be stripped clean, ready to be swung clear of the frame.

The engine is supported on the frame at three points. Pass a chain about the cylinder block and with a hoist carefully lift it from the frame, after which the engine can be lowered to a wooden frame made to fit it, with an eye towards having each point easily accessible.

MILEAGE IS LESS THAN FORMERLY.

(H. L., Newark, O.)

I have a 1915 Dodge and used to get 20 miles to the gallon of gas. Since putting on a Stewart vacuum feed system I have only been able to get 15 miles to the gallon. Please explain the reason for this in the next issue. Work was done according to the instructions of the Stewart Co., so do not understand the reason for it.

We assume from the fact that you get 15 miles to the gallon since putting on the Stewart vacuum tank that you have attached the Stewart system properly. We assume also that you have drilled the small air vent in the main gasoline tank cap to allow air to displace the gasoline drawn out.

You will find since you have changed from a pressure system to a vacuum system that your gasoline flows more freely, for as you can readily see you are really using a gravity system on a small scale. We advise cutting down your mixture by turning the metering pin at the bottom of the carburetor to the left a very little. This will make the mixture lean. Turning it to the right will give a rich mixture, which you do not want.

Further than this the gasoline and air adjustments on the Stewart carburetor used on your car are automatic and any adjustments to them should be done by a Dodge repair man.

Be sure that there are no flat places in your feed pipe, either between the main tank and vacuum tank or between vacuum tank and the carburetor. A flat place in the feed line will hold back the gasoline flow.

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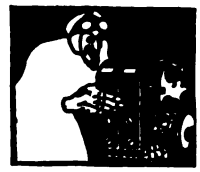
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31x3½	12.00	35x4½	18.00
32x3½	11.00	35x5	21.00
31x4	12.75	36x4½	19.00
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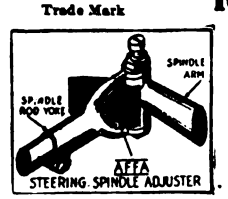
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31x4	$8.50	35x5	$13.50
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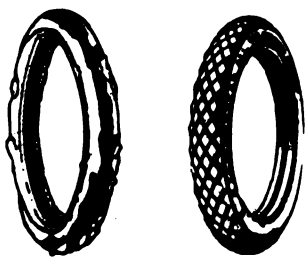
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Magnetos,	$3.50 up	B. Presto Tanks,	$4.75
Cylinders,	$3.00 up	Bearings,	50c up
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If you want any part not listed here.
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1070 Main St., Hartford, Conn.

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Room with bath, one person	2.50 & 3
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Parlor, bedroom and bath, 1 or 2 persons	5.00 & 6
Parlor, bedroom and bath, three persons	6.00 & 7
Parlor, 2 bedrooms and bath, 3 or 4 persons	7.00 & 8

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will fit car of any year

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Either Fin-Tube or Honey Comb Types

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THE AUTOMOBILE JOURNAL

VOL. LXVI. PAWTUCKET, R. I., JUNE, 1919. NO. 11.

Three Killed as Wilcox Wins Sweepstakes

Hearne Second and Goux Third—De Palma Has Great Speed But Hard Luck

HOWARD WILCOX of Indianapolis won the seventh International Sweepstakes at the Motor Speedway, Indianapolis, May 31, his time for the 500 miles being 5:44:21:75. Two drivers and a mechanician were killed and two others were injured.

The dead:

THURMAN, ARTHUR, of Newark, N. J., driver of the Thurman Special.
LECOCQ, LOUIS, of Los Angeles, Cal., driver of the Roamer Special.
BANDINI, R., of Los Angeles, mechanician for Lecocq.

Fifty thousand dollars was divided among the first 10 drivers, and of this Wilcox's share was $20,000. The other prize winners finished in the order named: Hearne, Goux, Guyot, Alley, De Palma, L. Chevrolet, Vail, G. Chevrolet and Thomas.

Wilcox and Guyot were team mates. Wilcox assumed the lead as the contest approached the half-way mark and drove consistently throughout. He had two stops, one for a tire change and on the other occasion to take on gasoline, oil and water and to repair a loose steering knuckle. His average was 87.12 miles an hour.



HOWARD WILCOX.
Winner in Sweepstakes.

ORDER OF WINNERS.

H. Wilcox	Peugeot
E. Hearne	Durant Special
Jules Goux	Peugeot
Albert Guyot	Ballot
Tom Alley	Bender
Ralph De Palma	Packard
L. Chevrolet	Frontenac
Ira Vail	Hudson Special
G. Chevrolet	Frontenac
Rene Thomas	Ballot

Ralph De Palma shattered all records for the Indianapolis speedway for the first 200 miles. Long stays in the pits, however, put the Italian driver almost entirely out of the running, and it was only by terrific speed that he managed to finish sixth. He barely nosed out L. Chevrolet.

Results.

First—Wilcox, time 5:44:21:75; average 87.12.
Second—Hearne, time 5:46:15:05; average, 86.64.
Third—Goux, time 5:50:49:90; average 85.51.
Fourth—Albert Guyot, time 5:53:33:50; average, 84.85.
Fifth—Tom Alley, time 6:06:04:35; average 81.26.
Sixth—De Palma, time 6:10:10:92; average 81.04.
Seventh—L. Chevrolet, time 6:11:46:33.
Eighth—Ira Vail, time 6:14:38:62.
Ninth—G. Chevrolet, time 6:15:14:88.
Tenth—Rene Thomas, time 6:25:27:19.

About 125,000 persons witnessed the automobile classic, and the race proved one of the most sensational ever run at



EDDIE HEARNE.
Second in Big Race.



JULES GOUX.
Winner of Third Money.

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Indianapolis. Broken steering knuckles, the loss of wheels, two cars overturning without serious injury to their occupants and the fatal mishaps kept the crowd on edge from the start to the finish.

Thurman Killed.

The first fatality occurred when the car driven by Arthur Thurman turned over on the back stretch before the race had progressed 250 miles. Thurman, who had reassembled the car in which he entered the race, was dead when he was found under the wreck of his machine. His mechanician, M. Molinaire, suffered a fractured skull.

With De Palma in his Packard leading the drivers at this time were traveling around the speedway at a terrific pace, breaking all records for the course during the first 200 miles. The accident to Thurman did not cause them to lessen their speed and the crowd, at first horror stricken, settled down to witness the finish of the long grind.

Not long afterward a cry went up at the southwest corner of the speedway, where Lecocq, in attempting to make the turn without cutting down his speed, skidded for a while and then turned over. The gasoline tank of the car exploded, covering Lecocq and his mechanician with burning gasoline. Some of the spectators, together with the guards at the point where the accident occurred, made a rush for the burning car, but it was five minutes before they could extinguish the fire. Lecocq and his mechanician, who were strapped in their seats, were burned beyond recognition.

Race Through Flames.

In the meantime the rest of the contestants continued their mad whirl around the track. The flaming gasoline, which was sent in all directions when the tank of Lecocq's car exploded, was picked up by some of the racing cars and carried to several parts of the speedway.

Others of the racers rushed through the flames sent up by the burning Roamer while the rescuers were attempting to extinguish them. When some of the drivers learned of the second fatality they slowed down their speed somewhat, so that at the finish the leader's average was 87.12 miles, while at the 275-mile point it was 91.34 miles an hour.

The purse was divided as follows: First, $20,000; second, $10,000; third, $5000; fourth, $3500; fifth, $3000; sixth, $2200; seventh, $1800; eighth, $1600; ninth, $1500; 10th, $1400.

J. Chassagne, relief driver for Bablot, and his mechanician were injured, but not seriously, when their machine went over on the north turn.

The showing of a number of Frenchmen, made favorites at the start because of their sensational work in practise, was a disappointment to the crowd. The great pace at the start, however, in which they were consistently among the leaders, resulted in many stops.

Wilcox has partaken in every 500-mile race held at the Indianapolis speedway. It was his first victory.

At no time was the field strung out, not more than two minutes separating the winner and the second man. The remainder of the field was proportionately bunched.

Flying Start.

The race started under a sweltering sun at 11 a. m. The hum of big motors filled the air from daylight until the race ended. Airplanes flew over the speedway early in the day and mingled their roar with that of the racing cars being tuned for the long grind.

The race began with a flying start, the first lap being paced by a car, not entered in the contest, which was driven by Eddie Rickenbacher, the American ace. That lap did not count in the number to be made.

At the end of the first 50 miles De Palma led; Wilcox was second and Thomas third. The speed then was 92.14 miles an hour.



ALBERT GUYOT.
Fourth in Sweepstakes.

Boillot was left at the post at the start for a half lap, but got away in a sprint to catch the field.

W. W. Brown pulled into the pits in 11th lap with broken connecting rod.

At 75 miles Boyer went into pit on three wheels and was declared out of the race.

De Palma led at the first 100 miles. Bablot second and L. Chevrolet third. G. Chevrolet was fourth. All previous records of the speedway for that distance were broken, the average speed being 92.70 miles an hour.

De Palma Takes Lead.

At 200 miles G. Chevrolet had to stop at the pit and change from first to third position. De Palma took the lead by the change, with Wilcox second. Others in order were L. Chevrolet, E. Cooper, Lecocq and Hearne. Average speed 91.20 miles an hour.

At 275 miles Wilcox led, with others in order being G. Chevrolet, E. Cooper, L. Chevrolet, Guyot, Boillott, Alley, Goux, Vail and d'Alene. The average speed was 91.34 miles an hour.

De Palma had considerable tire trouble and lost 25 miles while at the pits making changes.

At 300 miles the standing in order was: Wilcox, Gaston Chevrolet, Cooper, Hearne and Boillot.

After the accident to Lecocq's car the speed became slower. The time for 325 miles was 3:27:07:10, or an average of 89.81 miles an hour. Leaders at that point were Wilcox, G. Chevrolet, Hearne, Cooper, Boillot, Goux and Alley. Seventeen cars remained in the race when 300 miles were run.

Wilcox was leading at the end of 400 miles, having made the distance in 4:27:14:02, or an average of 89.81 miles an hour. Hearne was second and G. Chevrolet third.

Wilcox stopped at the pits for gas and tires and when he resumed the race he was two laps ahead. At 450 miles the standing was Wilcox, Hearne, Goux, Boillot, L. Wagner. L. Chevrolet rolled into the pits on three wheels at this time.

Thurman Dark Horse.

Arthur Thurman, who was killed when his car turned turtle, was a dark horse, having entered his Thurman Special, an unknown car, at the last moment. In the elimination trials two days prior to the race his car showed surprisingly well and the young man driving made the speed fans look up.

His official time in the eliminations was at the rate of 98 miles an hour, just behind De Palma, in his famous Packard Aviation car, which then made 98.14 miles an hour. Several men who clocked Thurman in the trials said he frequently put his car up to 100 miles an hour.

He must have been over-encouraged by his performance in the elimination and probably made too great an effort to win. It was his first trip in such fast company and he had never before driven on a two-mile brick track.

The Indianapolis speedway is considered one of the hardest of the large tracks to drive on. It is easier on the motors than the Sheepshead Bay speedway, as the speed is shut off on the flat turns, while at Sheepshead Bay the motor is never shut off. It is a case of "pressing the board," as the men say, all the while. At Indianapolis the driver attempts to make higher speed on the straightaways to make up for lost time on the turns.

Ballot Team Disappoints.

The Ballot team did not show in the grind up to the expectations of the experts. Many thought the trio would run completely away from the field. De Palma's bad luck was also a disappointment to a large army of fans with whom he is an idol.

Tommy Milton, who won the Uniontown (Pa.) sweepstakes earlier in the month at nearly 97 miles an hour, was looked upon as a likely front finisher, but he, too, fell by the wayside. Louis Wagner, the old Vanderbilt Cup favorite, was expected to put his Ballot in the lead and hold it, and even though he failed in the attempt his admirers would not admit that it was the fault of his driving. Albert Guyot was not figured as the best driver of the Ballot team, but turned the trick on his team mates, Thomas and Wagner.

(Continued on Page 52.)

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RICKENBACHER'S GRAPHIC STORY OF GREAT RACE

Noted Ace Writes His Impressions of Sweepstakes.

THIRTY-THREE powerful motors, with a pair of determined fighters backing each, faced the checkered banner. It was not exactly anybody's race, but capital honors were within the reach of fully half the field.

A handsome emerald speedster took the inside rails and the stands came to attention as the squadron of contestants in columns of fours wheeled into the pace that added another palm to America's decorations.

Ralph De Palma, a decided favorite with the infield and the stands, set the pace at the beginning and led the way consistently for 30 laps. It would seem the race was between his Packard and any of the great French racers. For nearly 50 miles they see-sawed with De Palma in an effort to make him show his hand.

With the first century reeled off, De Palma led, but with Louis and Gaston Chevrolet, holding second and third, none of the trio having stopped.

Wilcox Has Mishap.

Howdy Wilcox drew his first recognition from the crowd in the 30th lap when he limped in on an empty casing. A new wheel was locked and the champion was away in 30 seconds with a mighty applause, spurring him on to nobler efforts.

In the 37th lap, Ralph Mulford cracked his rear axle and was out directly in front of the judges' stand. As usual he smiled, for clicking typewriters seemed to salute the graceful loser.

De Palma, still in the lead, stopped for the first time in the 57th lap, and a minute and a half had elapsed before his crew put him under way. In the next lap Gaston Chevrolet at his wheels, passed De Palma and took the lead.

At 150 miles Wilcox made his first bid for position when he pulled up behind the leaders, De Palma and Gaston Chevrolet. The Hoosier speed champ moved up to second place at 200 miles, forcing the Frontenac into third and brushing the Packard at the turns.

Wilcox Forges Ahead.

At the half way mark Wilcox shot into the van and led the field for the remaining 250 miles. The two Frontenacs, with Louis and Gaston Chevrolet pushing to the utmost, were close behind the leader, while De Palma was in serious trouble at the pits. In the following lap Louis Chevrolet cracked and completely lost a rear wheel and ragged past the paddock at 70 miles an hour.

This cost him his position and a little later De Palma suffered a similar setback when he put in seven minutes at the dugouts.

It was not practically assured that Howdy Wilcox would not relinquish his advantage, and although 30 miles ahead of De Palma, he still had dangerous competition from several of the other old timers. With 150 miles between him and the championship of two continents, Wilcox drove and coaxed and lashed his



Edward V. Rickenbacher.

mount to the last ounce of his ability. The stands by this time were shouting Wilcox, but Louis Chevrolet, now in his brother's car, was giving him a lot to worry over.

Hearn Threatens Leader.

At this stage of the game Eddie Hearn thundered into third place and a little later nearly took the bit from Howdy.

Skimming the earth at 100 miles an hour, Louis Chevrolet threw a wheel and was out of the race. The determined Frenchman used up two cars in his bid for honors and his miraculous escape from injury was only less noteworthy than his sportsmanship.

At 400 miles Howdy Wilcox was within striking distance of fame and traveling at the very comfortable pace of 89 miles per hour. Eddie Hearn, the California favorite, had his Chevrolet right up against Howdy's tail, and when the Hoosier halted at the pits the speeding westerner got a fleeting glance of final honors.

Californian Closes Gap.

While Howdy sweated and lost time at the dugouts, the native son was squeezing every ounce of available gas into his mighty motor. Gradually he gained a lap and Wilcox gave him a troubled look as the Chevrolet thundered by.

The stands were wild with the possibilities of a duel to a finish between Hearn and Wilcox and before the latter's crew could put him on the course, Eddie was around the second time.

Even the most sedate of onlookers caught the thrill of the dramatic finish that was working to a climax. From 10 miles Hearn had cut the lead to three and his motor never sounded better. Slightly refreshed and as determined as ever, Wilcox tore out into the home stretch and 57 minutes later flashed across the timing wire the peerless pilot of five great nations.

Reminds of "Over There."

As I write these impressions I find myself much in the same frame of mind as I was many an evening on the western front. The kaliedoscope of thrills in this race has perhaps moved faster, although not so violent.

Our work over there started before the first peep of the rising sun and we did not get the checkered flag until the speedway of the clouds was dark and cleared of every contestant. The period of combat of this memorable battle was limited to five dramatic hours into which have been rushed all the sensational thrills that come from a day of fatalities, tottering champions, cars in ashes and a hundred thousand electrified spectators cheering their favorites to go a little faster.

Broken steering wheels, splintered axles and courageous drivers shoving their broken mounts off the track with a determined gain brought cheers and plaudits.

As long as men with fighting spines will post their lives to prove their valor and ability and thereby capture the honors of the victor some will have to pay the unnamed price. And I regret to put it down that the toll of an eventful classic finds the names of three lads who will never take the wheel again.

Despite these inevitable fatalities that have characterized the making of a new champion, I sincerely believe that the Liberty Sweepstakes will go down in the pages of racing more as having featured more wonderful drivers and indescribable thrills than any event in all the annals of motor driven competition.

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Tommy Milton Wins In Sweepstakes at Uniontown

The opening of the 1919 automobile racing season in the East, at Uniontown, Pa., May 19, proved a big triumph for Tommy Milton, the youthful speedster from St. Paul, and scion of a wealthy family of that city. At the wheel of his Duesenberg he outdistanced a field of 13 contenders, winning the 112½-mile Victory Sweepstakes, in 1 hour, 10 minutes, 9.32 seconds, maintaining an average speed throughout the race of 96.24 miles an hour—a new track record for this distance.

In capturing the Universal Trophy and setting up a new speed mark for the track, Milton verified the track tradition that no driver can win at Uniontown without making a continuous run, for he drove a wonderful non-stop race, and at the finish crossed the line at a speed better than 100 miles an hour.

The veteran, Louis Chevrolet, in a Frontenac, led the field for the first five laps, when he was passed by Ralph Mulford, also driving a Frontenac, and for 52 laps the contention between these two seasoned speed demons provided thrilling entertainment for the spectators. But in the meantime Tommy Milton was gradually creeping up on the two leaders and on the 52nd lap assumed the lead, holding it until the finish.

Chevrolet Second.

Louis Chevrolet stormed across the tape but a few seconds behind the flying Milton, closely followed by Ralph Mulford. Cliff Durant, in a Chevrolet Special, Joe Boyer, driving a Frontenac, Louis LeCocq, at the wheel of a Roamer, and Kurt Hitke also piloting a Roamer, finished in the order mentioned. Chevrolet, Durant and Hitke also finished the race without a stop for any purpose. All the finishing drivers piloted cars equipped with Goodyear cord tires and Goodyear tubes.

The race was not without the usual thrills. On the 16th lap Omar Toft, driving a Toft Special, threw a wheel just after passing the grandstand, while traveling 95 miles an hour. In a wonderful exhibition of driving skill and daring, Toft brought his three-wheeled mount to a place of safety near the inner rail, while the other drivers whizzed by. The runaway wheel, with its tire intact, continued down the track and took the curve beautifully, traveling about 500 feet, when it took a bound and disappeared over the fence.

Only a few seconds later the big Mercer car, driven by Joe Thomas, the Pacific coast racing star, in coming down from the famous Death Curve, struck the outer rail and whirled around the track several times, with the spinning wheels emitting sparks of fire, finally crashing into the opposite rail, without injury to the driver. Inspection showed a broken spring and a sprung axle, putting the car out of the running.

INTER-CITY DRIVING MATCH WILL BEGIN THIS MONTH.

Captain E. V. Rickenbacher will referee the inter-city automobile team reliability match to be held this month, when New York Athletic Club will meet the Chicago Athletic Association and Chicago Automobile Club in a two-day drive from New York to Greenfield, Mass., and return.

The contest is to be for the Rickenbacher trophy. Chairman W. C. Poertner of the New York Athletic Club's Automobile Committee, which is arranging the details of the match, has decided on Greenfield for the night stop. The route is being laid out by E. R. Mixer, and it is intended to go to Greenfield via Dan-



R. M. Owen.

bury and Waterbury, Conn.; Hartford and Springfield, Mass., with the noon stop at Waterbury. At Greenfield the motorists will stop at the Weldon for the night.

The next morning they will hit the Mohawk Trail and climb the Hoosic Mountain, dropping down to North Adams. On the way home they will pass through Pittsfield, Lenox, Stockbridge and Amenia, with the finish at Travers Island. This itinerary will mean about 170 miles of traveling each day.

It looks as if the New York Athletic Club would have more candidates for the team that it can handle. Captain W. Irving Fickling already has 15 members listed.

KISSEL ENGINEERS PERFECT AUTOMATIC OIL CONTROL.

Kissel engineers have perfected an automatic oil control which, it is claimed, accomplishes the following results:

A—When the motor is pulling its maximum load, or using its full horsepower, with the throttle wide open, the new Kissel Automatic Oil Control provides the "maximum oil pressure needed," as well as the necessary "oil supply" to maintain the proper oil film under this full load condition.

B—When the motor load is reduced and the throttle closed the new Kissel Automatic Oil Control automatically reduces the oil pressure as well as the oil supply.

C—It prevents the piling up of oil at either end of the oil basin, i. e., when going up a grade or when going down a grade.

D—It distributes the correct amount of oil in the oil pockets for each cylinder, regardless of the grade, load condition or speed. No cylinder is ever starved of oil or gets too much.

World Record Broken by De Palma at Sheepshead Auto Race

Ralph De Palma, taking the lead in the 13th mile of a 50-mile international auto race at Sheepshead Bay track June 14, broke all world's records for 50 miles, a winning by a margin of a third of a lap in 26 minutes 23.2 seconds. The previous record for the distance was 26 minutes 57.3 seconds, made by Louis Chevrolet over the same track Sept. 22, 1917. De Palma alternated in second and third positions with Ralph Mulford leading for the first 12 miles, but on the next lap he shot to the front and never was headed. He crossed the finish line two-thirds of a mile ahead of Dave Lewis and Joe Boyer, who finished second and third, only a few feet apart.

At 30 miles De Palma's time was 15 minutes 53.6 seconds, wiping out the new world's time of 16 minutes 20.3 seconds made by Mulford in another race scarcely an hour previously. His time for 40 miles, 21:39.4, and his average speed for the 50 miles was 114.5 miles an hour.

Dario Resta had engine trouble at the start and quit the race on the first lap. Jra Vail retired for a similar cause in the fourth.

Four races, two at 10 miles each, one at 30 miles and the 50-mile event, made up the program. Mulford won the 30 and one of the 10-mile races, the other 10-mile event being won by Thomas Milton.

A new record, 16 minutes 20 3/5 seconds, in the second heat, 30 miles, was established by Ralph Mulford, the winner. The previous best mark was 16 minutes 31 2/5 seconds, made by De Palma on this track last August.

De Palma finished second, David Lewis third and Joseph Thomas fourth.

Mulford rove at the average speed of 110.14 miles an hour.

Milton, Reynolds, Vail and Boyer did not start in this event.

A new record for 10 miles was established by Tom Milton in the first heat of the 10-mile international sweepstakes contest. Milton's time was five minutes 20 1/5 seconds, which is 3 3/5 seconds faster than that made by Ralph De Palma on the same track on Aug. 27 last.

The third heat, 10 miles, substituted for the 20-mile event, was won by Ralph Mulford in 5 minutes 24 1/5 seconds, an average speed of 111 miles an hour. Boyer second, De Palma third and Lewis fourth. Milton and Joseph Thomas were the only other starters.

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Succint Interviews with Makers of Automobiles

W. L. Kissel, secretary and treasurer of the Kissel Motor Car Co.—"In no industry is there demanded a greater scale of efficiency, accuracy and skilled experience than in building motor cars. The continuous advance in automobile development speaks volumes for the type of labor employed in the motor car industry and is proof that the manufacturing of motor cars in all its ramifications must advance to keep pace with the progress typified in the present day models."

R. C. Rueschaw, vice president of the Mitchell Motors Co., Inc., Racine, Wis.—One of the signs of the return to normal is a big demand for passenger cars. It takes a long time for any automobile factory to get back into production so that with only a normal demand there was a marked shortage of cars this spring. It is a peculiarity of such a shortage that instead of dampening the desire of the people to own cars it is increased when they find difficulty in getting them. Thus, as production increased, demand increased even faster so that the shortage has not been relieved and the outlook now is that it will not be for a number of months to come."

Edward S. Jordan, president of the Jordan Motor Car Co.—"The demand for motor cars is of course stupendous. There is no prospect of a lull in the industry. In fact, we believe the saturation point will never be reached until every man earning above a certain amount has a motor car, and none ever wears out."

H. W. Anderson, general sales manager of the Templar Motors Corporation—"The automobile manufacturers are going along, building every car they can, and leaving the price question to be decided, as it ultimately will be, to law of supply and demand. There will be no decrease in the price of Templar cars without a drop in the price of materials and labor, both of which are improbable, and certainly not now apparent."

Roy Davey, general sales manager of the Bethlehem Motors Corporation—"Efforts to make capital of the multiplicity of government owned motor vehicles are reprehensible. Such stories injure the motor truck business for the time being. The manufacturers are sufferers, but in the end will, of course, lose only the temporary advantage which comes from a steady scattering of their product. Some have held up on production due to hesitancy of business men to order in the face of the oft repeated statement regarding the marketing of the government trucks and cars, and such makers will suffer through inability to supply the goods when the real rush comes—after the public has come to know all of the real facts and has come to realize once and for all that the U. S. government will do not one thing to check so important an industry as motor truck and passenger car manufacturing."

J. P. MAHONEY SUCCEEDS SMITH AS BUDA SALES MANAGER.

The Buda Co., Harvey, Ill., manufacturer of Buda engines for trucks and tractors, has announced the appointment of J. P. Mahoney, for three years its



J. P. Mahoney, Appointed Sales Manager of the Buda Co., to Succeed Lon R. Smith.

general purchasing agent, as successor of Lon R. Smith, whose resignation as sales manager will take effect June 1. Mr. Smith will go to the Mid-West Engine Co., Indianapolis, Ind., as general sales and advertising manager.

Mr. Mahoney's appointment to this position is stated to be the logical result of his close affiliation with the sales department during his three years' service with the company, in charge of purchasing, stores and planning work. Mr. Mahoney is said to be an aggressive merchandiser, is well known in the automotive industry, and is thoroughly conversant with the engineering requirements of his new department.

JOIN MOTOR AND ACCESSORY MANUFACTURERS.

The following were recently admitted to membership in the Motor and Accessory Manufacturers' Association:

Auto Wheel Co., Lansing, Mich.; Benjamin Electric Manufacturing Co., 806 W. Washington Boulevard, Chicago, Ill.; Black & Decker Manufacturing Co., 105-115 S. Calvert street, Baltimore, Md.; Budd Wheel Corporation, 22nd street and Lehigh avenue, Philadelphia, Pa.; Columbia Axle Co., 850 East 72nd street, Cleveland, O.; E. Edelmann & Co., 351 East Ohio street, Chicago, Ill.; William R. Johnston Manufacturing Co., 359 East Ohio street, Chicago, Ill.; Parker Axle and Products Corporation, 19 West 44th street, New York; Standard Tire Co., Willoughby, O.; Sunderman Corporation, Lake and Ann streets, Newburgh, N. Y.; Texas Co., 17 Battery Place, New York; U. S. Ball Bearing Manufacturing Co., 4535 Palmer street, Chicago, Ill.

Records of Daily Car Output in Ohio and Michigan

Daily car production figures for Michigan and Ohio automobile plants thus far this year follow:

	Jan.	Feb.	Mar.	Apr.	May
Buick	100	400	450	500	500
Briscoe	30	50	50	75	75
Barley	..	4	10	10	10
Cadillac	55	60	80	100	80
Chalmers	30	65	70	80	80
Chandler	..	50	90	60	70
Chevrolet	..	300	350	700	726
Columbia	8	10	15	18	20
Dodge	300	375	400	500	500
Dort	40	65	70	100	100
Ford	1,300	2,000	2,400	3,000	3,000
Harroun	4	4	10	15	15
Hudson	30	50	50	100	100
Hupp	38	55	65	75	60
King	..	4	10	10	10
Liberty	15	15	25	30	30
Maxwell	150	150	220	250	250
Olympian	4	5	10	10	12
Oldsmobile	..	110	140	140	150
Overland	320	400	442	600	200
Packard	..	..	1	25	25
Paige	50	50	55	70	75
Paterson	10	10	10	15	15
Jordan	..	..	..	12	15
Reo	100	100	125	125	125
Saxon	10	50	65	50	35
Scripps-Booth	20	40	45	45	50
Studebaker	150	150	175	200	150
Winton	..	..	..	10	10
Essex	30	50	50	100	100
Grant	25	35	50	50	50

COUNCIL OF NATIONAL DEFENSE STUDIES SHORT HAULS.

The Council of National Defense through its Highways Transport Committee is endeavoring to work out the short haul problem for the benefit of all concerned. It desires the following information concerning motor truck concerns now in operation: Name and address of operators, number and capacity of trucks in use, routes and schedules and rates (with copy of tariff wherever possible). These cities have been selected for the survey: Boston, New York, Philadelphia, Pittsburgh, Baltimore, Washington, Atlanta, New Orleans, St. Louis, Chicago, Detroit, Cleveland, Omaha, Denver, Dallas, San Francisco, Los Angeles, Portland and St. Paul. The information should be sent to the Council of National Defense at Washington.

TRADE LITERATURE.

The DuPont Fabrikoid Co., Wilmington, Del., has issued a folder describing the "Victory Finish," which is bound to interest top makers, trimmers and auto finishers.

"The Old Car and the New" is the title of a booklet issued by the E. I. du Pont de Nemours & Co., Wilmington, Del., which is of special interest to automobile repair shops and car owners. It describes how to apply a new factory finish and what to use.

NEW REPAIR DEPOT.

The Highways Motor Corporation has leased the store at 1201 North Charles street, Baltimore, Md., for an automobile repair depot.

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CHANGES IN RULINGS ON WAR EXCISE TAX

THE National Automobile Chamber of Commerce, Inc., has issued the following bulletin relative to important modifications and additions to regulations No. 47 of the War Excise Tax on Automobiles, covering particularly taxes on truck chassis and taxes on sales of parts to manufacturers under the revenue act of 1918:

Confirming the telegram sent to N. A. C. C. members, the Treasury Department at Washington (Daniel C. Roper, Commissioner of Internal Revenue,) has just issued certain modifications and additions (approved May 31) to regulations No. 47 under section 900 of the Revenue Act of 1918 relating particularly to the taxes on truck chassis and also to taxes on parts or accessories sold to manufacturers or producers of complete vehicles. Copies of this (Treasury Department No. 2852) have been sent to local collectors of internal revenue and others concerned.

The Treasury Department officials were impressed with the fairness of the request for changes that were made by the various organizations in the industry, including the National Automobile Dealers' Association, Motor and Accessory Manufacturers' Association, Rubber Association, of the U. S. A. Automotive Equipment Association, N. A. C. C., other associations and the individual manufacturers and dealers.

Following are the sections of T. D. 2852 which affect the automobile industry:

"Article six of Regulations No. 47, entitled 'Credit for taxes already paid,' is hereby modified by adding at the end thereof a paragraph as follows:

"The following records and evidence will be deemed sufficient to establish this right of exemption: (1) any record or statement showing the exact amount of tax paid upon such articles; (2) a certificate or statement of the following tenor: 'The undersigned hereby certifies that the articles on which credit for tax is claimed were taxpaid and that said articles were used by ———————— in the further manufacture of other articles taxable under section 900 of the Revenue Act of 1918.

Signed————————

Extension of Time for Filing of Returns.

"Owing to the delay in the printing and distribution of the necessary forms, the time is extended to June 15, 1919, for filing returns for taxes imposed by section 900 of the act, due for the period from Feb. 25, 1919 to March 31, 1919, inclusive, and for the month of April, 1919.

"Returns filed and taxes paid for these periods are not to be regarded as delinquent if made on or before June 15, 1919, and no penalty is to be collected or asserted in such cases. Should such returns not be filed and taxes paid until after June 15 the penalties prescribed by the statute will be invoked.

Exchanges Pursuant to Guaranty.

"Where any article taxable under section 900 is returned to the manufacturer thereof, for adjustment, replacement or exchange, under a guaranty as to quality or service, and a new article given pursuant to a guaranty, free or at a reduced price, the tax shall be computed on the actual price, if any, to be paid to the manufacturer for the new article.

"Article 14 of regulations No. 47, entitled 'Tires, inner tubes, parts and accessories sold to manufacturers' is hereby modified to read as follows:

"Subdivision (3) of section 900 of the acts exempts from tax sales of tires, inner tubes, parts or accessories to a manufacturer or producer of automobile trucks, automobile wagons, other automobiles, motorcycles, tires, inner tubes, parts or accessories. To come within the exemption the sale must be to such a manufacturer for use by him in the manufacture or production of automobile trucks, automobile wagons, other automobiles, motorcycles, tires, inner tubes, parts, or accessories, or for sale by him on automobile trucks, automobile wagons, other automobiles, or motorcycles, or in connection therewith or with the sale thereof or in connection therewith or with the sale thereof or for free replacement under contract or guaranty. If sold to such a manufacturer for any other purpose, such as resale to a dealer or for the rebuilding of used cars, the sale is taxable. In order for the sale to come within the exemption of the statute, the manufacturer must at the time the goods are shipped or sold (whichever is prior) have in his possession an order or contract of sale, with certificate of the purchaser in writing printed thereon or permanently attached thereto, showing that the tires, inner tubes, or accessories so purchased are to be used in the manufacture of new automobile trucks, automobile wagons, other automobiles, motorcycles, tires, inner tubes, parts, or accessories, or for sale on automobile trucks, automobile wagons, other automobiles, or motorcycles, or in connection therewith or with the sale thereof or for free replacement under contract or guaranty. Following is a form of the certificate or statement which will be accepted:

"The undersigned hereby certifies that the tires, inner tubes, parts, or accessories purchased hereunder are purchased with the intention of using them in the manufacture or production of automobile trucks, automobile wagons, other automobiles, motorcycles, tires, inner tubes, parts or accessories, or for the sale on automobile trucks, automobile wagons, other automobiles, or motorcycles, or in connection therewith or with the sale thereof, or for free replacement under contract or guaranty. In case any of the tires, inner tubes, parts or accessories sold hereunder are diverted from this use, the purchaser will account for such tires, inner tubes, parts or accessories to————————, the manufacturer thereof, at least once during each calendar year and will pay the tax thereon to him at the time such accounting is made.

Signed————————

"If it is impracticable to furnish a certificate for each order a certificate covering all orders between given dates (such period not to exceed a month) will be acceptable. If in any case such an order and certificate cannot be produced on demand of any authorized agent of the department the tax in respect to the sale will be considered in default.

"Substitute in place of the next to last sentence of article 15 of regulations 47, which reads as follows:

"A chassis is a part of an automobile and taxable at the rate of five per cent. when sold separately regardless of whether it is a chassis for an automobile truck or wagon or for any other kind of automobile."

The following:

"A chassis provided with a superstructure of such design that it is without substantial additions adaptable for hauling heavy loads is an automobile truck or automobile wagon and taxable at the rate of three per cent. A chassis not so equipped is an 'other automobile' taxable at the rate of five per cent. Unless the manufacturer has actual knowledge that the chassis is to be used as an automobile truck, or automobile wagon, or has in his possession at the time the chassis is shipped or sold (whichever is prior an order or contract of sale with a certificate of the purchaser in writing, printed thereon, or permanently attached thereto showing that the chassis specified in the order is to be so used, the tax shall be five per cent. upon the manufacturer's selling price.

"Article 34 of regulations No. 47, entitled 'Manufacturer also retailer' is supplemented by adding a new paragraph to read as follows:

"In cases where it is impracticable to compute the tax in respect to articles sold at retail on the average wholesale price for which like articles were sold during the previous calendar month, the taxpayer has the option of basing the tax upon the ordinary or regular wholesale price for which like articles were sold during the previous calendar month."

Important Amendment To Regulations for Trucks

NEW RULING.

Under the new ruling, a chassis provided with a superstructure that is without substantial additions adaptable for hauling heavy loads is an automobile truck or automobile wagon, and taxable at three per cent. A chassis not so equipped is taxable at 5 per cent.

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USED CAR DEALERS DOING BIG BUSINESS

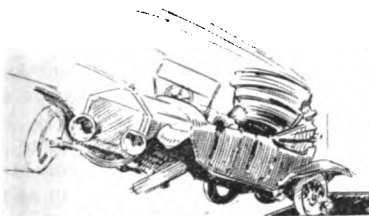
Shortage of New Automobiles Has Resulted in Flourishing Trade For Them

LATE last winter a man sold his two-year-old car, intending to buy a new one. The car was not in bad condition, but the man was glad to get rid of it for $300, as he desired to buy the latest model of another make.

He was greatly disappointed when he learned that the dealer who handled the machine he wanted to buy could not make any early deliveries. He finally decided to get another make, but he found that this also could not be secured for some months to come.

He went from dealer to dealer, but none could promise him an early delivery, so he eventually made up his mind that he would buy a used car to tide him over until the new car supply became normal again.

After an inspection of the offerings of several used car dealers he took a fancy to an automobile of the make he had recently sold. He was taken out for a demonstration trip and the car showed up in fine style. It appeared to be a much better machine than the one he had owned, and he bought it for $700.



Bought His Old Car.

Imagine his surprise not long afterward when he discovered that the car he had purchased was the same one he had formerly owned. After he had parted with it the car got in the hands of a used car dealer, who had it thoroughly overhauled and finished up so that it had a particularly smart appearance.

At first he felt that he had been properly "stung," but as the car continued to give satisfaction he reconciled himself to the conclusion that the used car dealer had not treated him so badly after all.

The used car dealer of today is a live-wire merchant, and he follows only good merchandising methods. He is a veritable wizard when it comes to having an old car put into tip-top condition. Give him an old broken down machine and he will transform it into one that will find ready sale.

Reaping Harvest.

With automobile buyers shopping as they never did before, not for the purpose of getting a car as cheap as possible, but to get almost any car that is on the floor for immediate delivery, it is no wonder that the used car dealer is reaping a big harvest.

Dealers in used cars are finding ready buyers at prices never before realized. Many of these used cars are but a year old, have run 8000 miles or less, have been thoroughly overhauled and placed in the best mechanical condition possible, worn parts being replaced by new, the cars repainted and often reupholstered and given new tires. Older models are also made to give good service.

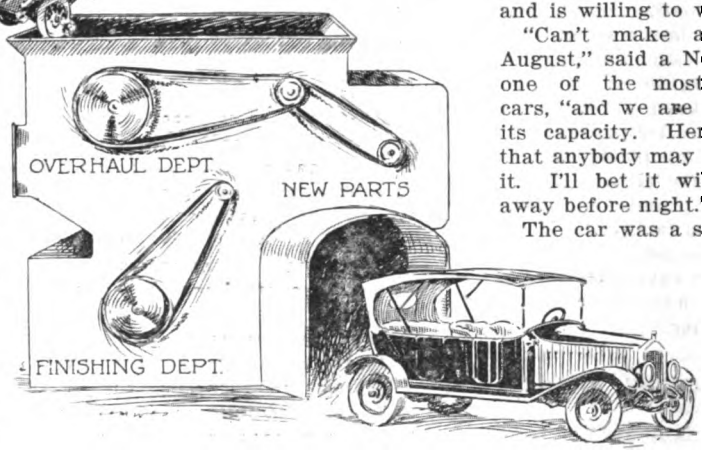
The used car dealer does not like the term "used cars." He calls his offerings reconstructed cars. He has great faith in verbal pyschology.

Many of these dealers have vast sums invested in their business. They engage expensive show rooms and conduct their business on the same high plane as the dealers in new cars.

Tremendous Demand.

A progressive dealer in Boston took advantage of the opportunity offered by the Boston automobile show by engaging a large hall near the show building, and there exhibiting his line of reconstructed models. He had a very snappy exhibition and he made a great number of sales.

A New York dealer, who has a mammoth hall for his cars, declares that his establishment has eclipsed all its former figures this season, and that since April 1 his business has totaled more than $1,000,000. Not in many years has there been such a tremendous demand for used cars, he says, and the shortage will not be met for some months.



Used Car Dealers Can Take the Wreck of a Car and Transform It Into a Good Machine.

This dealer and his associates, foreseeing the demand there would be for cars, spent six months prior to the opening of their place in scouring the large cities of the country and buying up hundreds of used cars of American and foreign makes. Nearly all his stock has been snapped up by buyers unable to get delivery of new cars.

Shortage to Continue.

"In my opinion," he says, "the shortage of new cars will not be relieved before the late fall. The volume of used car business today actually rivals that of new cars. The production today is greatly less than what it was two years ago, and there are four or five buyers for every new car of a popular make.

"As far as possible the shortage is being met by used cars, some of which are now selling at a premium. This is especially true of late models of class cars, which are now bringing almost their original prices."

New cars are selling so fast that some dealers are unable to keep even their show cars in stock. A great many show rooms are to be seen nowadays where there is not a single car. These dealers haven't even a machine for demonstration purposes.

'What difference does it make?" asked one dealer. "Suppose I held on to my demonstration cars, what good would they be to me, I already have more orders than I expect to fill for many months to come, and every car I get my hands on I am going to deliver right away."

Don't Care About Price.

The first question asked of salesmen is not the price of the car, but "Have you a car for immediate delivery?" Rarely is one to be found and then only when a car that has been sold has not been taken by the buyer, who has found perhaps he is not able to pay for it or has decided to change to a different model and is willing to wait for its delivery.

"Can't make any deliveries before August," said a New York salesman for one of the most expensive makes of cars, "and we are running our factory to its capacity. Here is a car, however, that anybody may have today who wants it. I'll bet it will be sold and taken away before night."

The car was a sport model which had been made on order with a custom body. The buyer had decided he wanted another model and did not take it. The price of the car was just under $7000.

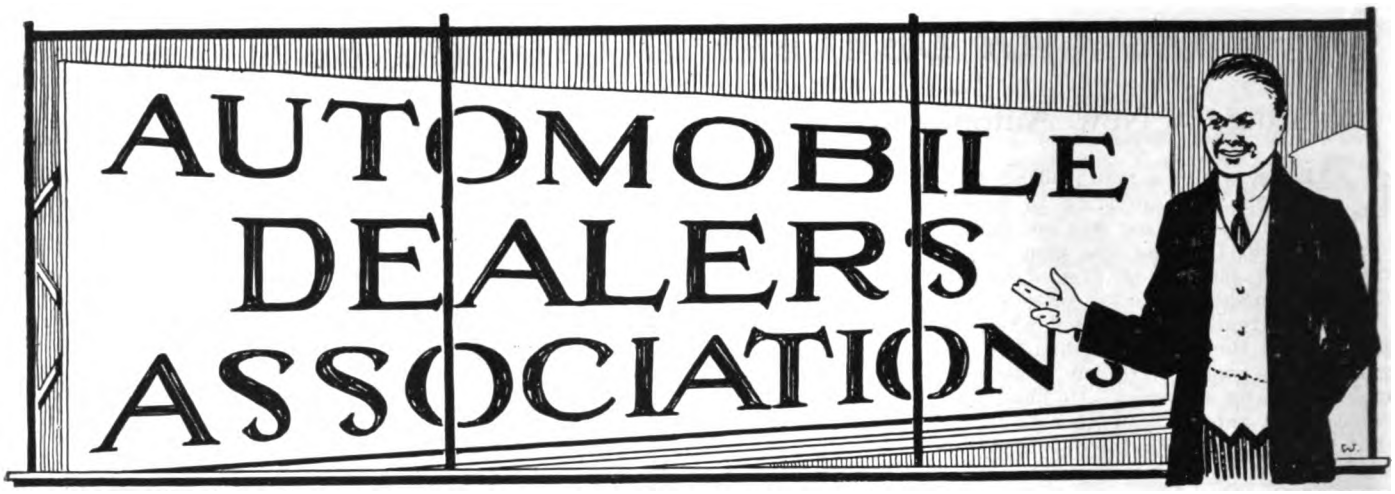
"To buy a rebuilt car, rather than one that is in doubtful condition, should be the aim of the motorist who is not a mechanical expert," states one dealer in used cars.

"Few cars can be depended upon for steady service unless they have been thoroughly overhauled. Caution in this respect is necessary without regard to the original high cost of the car, since it is quite improbable that cars without any mechanical defects would be disposed of by their owners.

"The demand for used cars in first class condition is greater now than at any other time. This is mainly due to the great shortage of new cars. An additional reason, too, is the greater care now being taken by the used car dealers to turn out their cars so that their performances will reflect credit to both seller and buyer."

He predicted that reliable used car dealers would form associations to elevate their business.

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ORGANIZE IN GEORGIA.

Automobile dealers of Georgia have organized the Georgia State Automobile Dealers' Association, with a large membership. Harry G. Moock, business manager of the National Automobile Dealers' Association, was the principal speaker at the organization meeting. "There has never been a time in the history of the automobile dealer business in the United States," he said, "that so many serious problems have confronted the industry. Not even in the days when the Federal War Trade Board threatened the extermination of the business by an intended classification as a 'non-essential' has the situation been so acute. There certainly has never been a time in the history of the Georgia dealers when the condition was more menacing and the immediate future holds but one promise of betterment. That promise is unity of thought, purpose and action." He referred especially to the action of revenue agents in confiscating cars stolen by automobile thieves and used for the illicit transportation of liquor.

N. A. D. A. COMMERCIAL BRANCH.

A department especially devoted to the interests of commercial vehicles has been opened by the National Automobile Dealers' Association and will handle problems that arise solely in the truck sales trade. H. N. Cartinhour of the Cartinhour-Bowman Co., Indianapolis, distributor of Federal trucks, is commissioner of the Commercial Vehicle Division. The object of the division will be to help devise ways for the dealers to sell trucks and trailers.

BOSTON DEALERS.

The Boston Automobile Dealers' Association recently took 1700 little boys and girls in automobiles on an outing to Nantasket Beach. There were 370 cars and trucks, the dealers furnishing most of them. The outing was under the direction of Chester I. Campbell, secretary of the association. Dinner and many other features were provided for the children. Every summer the Hub dealers take the little ones out for a day's outing.

WARNS DEALERS NOT TO MISREPRESENT WAR TAX.

That automobile dealers must for their own protection know what their liability for war tax is, first in order to properly account to the government, and second to avoid criminal prosecution for improper accounting and for misrepresentation of the war tax, is brought out in a letter to the National Automobile Dealers' Association from George H. Moore, St. Louis, collector of the First District of Missouri.

He sends a letter complaining against the misrepresentation of the tax and a notice that he will proceed against dealers in his district who are misrepresenting the tax to their customers. He also encloses an Associated Press dispatch telling of the arrest of a Maryland confectioner for misrepresenting the tax. The Revenue Department proposes to make a test case of the Maryland arrest.

Dealers are warned by the N. A. D. A. that the action that Collector Moore announces he will take also will be followed by collectors throughout the United States.

INDIANA SHOW.

The Indianapolis automobile and accessory show will be held at the Indiana State Fair, Sept. 1-6. It will be conducted by the Indianapolis Automobile Trade Association, 338 North Delaware street, with John B. Orman manager. The new automobile exhibition building is now in course of construction and will be completed about the middle of August. It is expected to prove the largest and finest automobile show building of any fair association in the United States.

CINCINNATI SHOW.

The ninth annual automobile show of the Cincinnati Automobile Dealers' Association will be held in the Music Hall, Sept. 13-20, inclusive, with H. K. Shockley manager.

MESSAGE TO DEALERS.

The National Automobile Dealers' Association sends this message to dealers: "Now is the time to work for the repeal of the five per cent. tax on automobiles, accessories, tires and parts and for the elimination of the three per cent. tax on trucks.

"The President has paved the way. In his message to the 66th Congress, which convened May 19, he advocated the repeal of the excise levies. Congress itself is in a favorable attitude.

"What are you as dealers doing to help bring this about? Are you using your proper influence and are you looking to the tire men, accessory men, parts men and the like for assistance?

"Here is the plan of action you must pursue if these taxes are to be repealed:

Plan of Action.

"You must get your local associations together. You must send resolutions, letters and telegrams to Washington to your senators and to your representatives, asking for the repeal of these taxes.

"You must send these resolutions as an association.

"Each member of the association should send an individual protest to his senator and his congressman.

"Each association should call upon every line of business allied with the motor car industry to send a similar protest.

"Each man in the association should ask every other business man he knows to make a similar protest. Interest the car owners. Have them send protests, too.

"Flood Washington with telegrams and letters, resolutions and petitions.

"If you are not interested in this matter, who is?

"If you are not going to look after your own interests in your own business, who is?

"The prosperity of the motor car industry depends upon prompt action. Get busy. Get busy now."

The New York Automobile Dealers' Association held its first reception in the new club rooms, at 1845 Broadway. Music and dancing, with a buffet luncheon, were the features.

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Gasoline Producers Join with Auto Makers

THE recent formation of the American Petroleum Institute furnished opportunity for the first definite attempt at co-operation between the manufacturers of automobiles and the producers of gasoline. Discussions between representatives of that organization and the National Automobile Chamber of Commerce, led to a meeting at the Manhattan Hotel, New York, at which there were present, representing the gasoline interests, T. A. O'Donnell, president of the American Petroleum Institute; R. L. Welch, secretary; C. C. Smith, assistant secretary; H. L. Doherty of the City Service Co., Dr. W. M. Burton, president of the Standard Oil Co. of Indiana; W. H. Isen, vice president of the Sinclair Oil Co.; W. C. Teagle, president of the Standard Oil Co. of New Jersey, and M. A. Robinson of the Riverside Oil Co.

Representatives in the automobile industry present were Col. Charles Clifton, president of the N. A. C. C. and president of the Pierce-Arrow Motor Car Co.; H. H. Rice, treasurer of the association and of the General Motors Corporation; J. Walter Drake, president of the Hupp Motor Car Co.; David Fenner, general manager of the International Motors Co.; Alfred Reeves, general manager of the N. A. C. C.; H. L. Horning, president of the Waukesha Motors Works, representing the Society of Automotive Engineers and the Motor and Accessory Manufacturers' Association, and S. A. Miles.

The immediate object of the meeting was merely the formation of an acquaintance between the two groups, in the expectation that more formal results would follow. Mutual problems were discussed, however, and it was decided to form a conference committee of five members from each side, each with power to appoint such sub-committee as may later be found desirable. The opinion was freely expressed that as a result of this meeting understandings will be reached which will have a definitely beneficial effect on each of the industries.

TO EXTEND FORD AUTO PLANT IN NEW JERSEY.

The Ford Motor Corporation is planning to erect a $500,000 plant for assembling automobiles on its property on the Lincoln Highway, Jersey City. The company has already overhauled its Eagle boat plant on the Meadows for use in automobile manufacturing. The assembling plant will be erected near the main plant.

MASTER BROOKLYN STATION.

The Master Motor Truck Corporation of New York has opened a new service station and garage for its Brooklyn business at 12 Emerson Place.

WHEAT TRACTOR MAKING TRIP ACROSS CONTINENT.

Following a send-off luncheon at the Automobile Club of America, New York City, a Wheat tractor started on a transcontinental trip, the first tour of the sort ever made by a tractor. Its ultimate destination is Los Angeles, and in going from coast to coast it will encounter all sorts of road conditions.

This unusual undertaking is not designed primarily as a spectacular stunt, but rather as a definite demonstration and proof that a farm tractor can be worked as efficiently on the road as in the field, provided it is properly equipped.

The tractor is equipped with road wheels and Firestone solid tires. Attached to it is a trailer which carries a three-bottom plow and a set of wide, cleated tractor wheels for use in plowing and other farm work. These wheels can be substituted for the rubber tired ones very quickly.

BRISCOE EXPORT ORDERS.

C. L. Thurston, export manager of the Briscoe Motor Corporation, reports that he has 1000 cars, only waiting for shipping permits, which are costly sold in Scandanavia, Belgium, Cuba, Mexico, India, Spain and Brazil. From England and France, he says, he has blanket orders for up to 1000 cars each, which will be confirmed as soon as the embargoes are lifted. Sample cars were shipped to these countries under a special import permit, and the Briscoe was one of the three American cars exhibited at the Lyons Fair, France. Five American cars were scheduled for the show, but only three arrived. "Belgium has made the most remarkable recovery," says Mr. Thurston. "Business in that country is coming stronger than in any other. The people have money with which to buy and, despite the despolation of the country, it looks as though it was going to make a wonderful comeback."

Vigorous Crusade in New York Against Motorists

With policemen instructed to make at least five arrests daily for alleged traffic violations, motorists in New York City are mighty shy of traffic cops these days. Between 200 and 300 arrests of autoists are being made every day. An attendant in the Traffic Court picked up on the floor of the court room a typewritten order addressed to the men of Traffic Precinct C, directing them to make at least five arrests a day of traffic violators. The order was signed by Captain John D. Ormsby.

Mayor Hylan and Police Commissioner Enright denied that they were responsible for the order, but the campaign continues nevertheless.

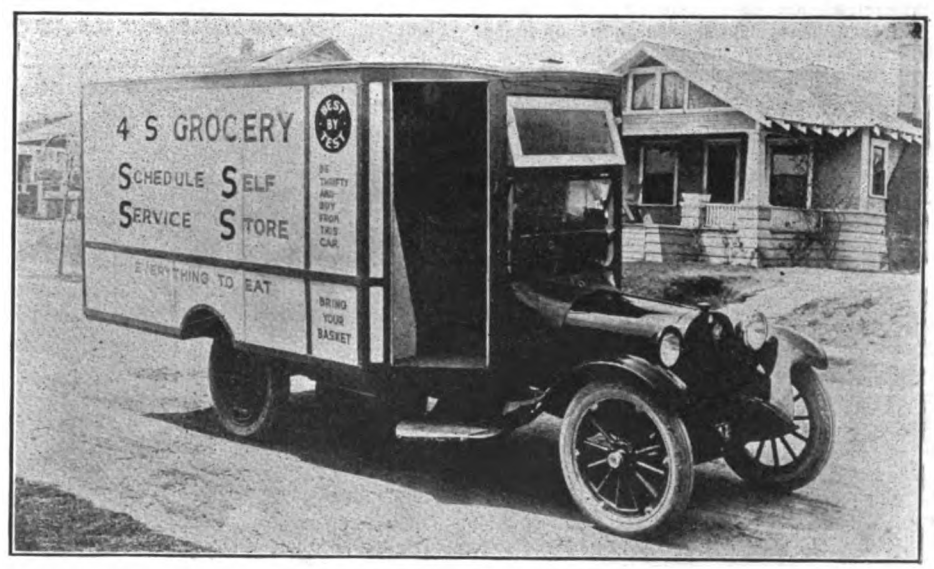
The order read:

"You must serve at least five summonses a day and as many more as you please. Mix the violations. Each man will consult the various violations herein set down and try to make one summons for each kind of violation. Make daily reports as to what you have accomplished to the sergeant."

Most of the arrests are for trivial violations and a great many of the motorists summoned have been discharged.

BIG AUTO SHIPMENT IS SENT TO AUSTRALIA.

When the freighter Katoa of the Union Steamship Co. sailed from Seattle recently, for Sydney and other Australian ports, it carried nearly a full cargo of automobiles. The pier was filled with the big crates containing the cars which had been sent on from nearly every automobile factory in the United States. They were big and small, and from the lowest to the highest priced cars. It was the biggest shipment sent from the port since 1916, when freighters were turned over to the Illinois Central Railway and 12,000 tons of Fords sent to Australia.



A Complete Grocery Store in a Body Mounted on a Dodge Chassis, That Serves a Large Section in a Southern State with the Best the Market Affords.

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Gastine Organization Develops World Business

THE GASTINE CO., Bridgeton, N. J., is the manufacturer of the famous product bearing the name Gastine, the power producer, carbon remover and gasoline saver. This product has been on the market for over four years and already has world-wide distribution. The company was started in a small way by its founder, I. W. Goldberg, who is now the president and general manager. Mr. Goldberg, ably assisted by H. L. Whitney, general sales manager; Roger Thomas Butts and Frederick J. Werner, both the latter being connected with the export department, has built up an organization that reaches to the four corners of the earth.

The low grades of gasoline and kerosene need rejuvenation, such as Gastine gives. Poor gasoline causes a quick accumulation of carbon in the cylinders.

The rapid growth of the Gastine Co. is due to the fact that the organizers are practical men. Mr. Goldberg studied chemistry at the West Jersey Military Academy. Mr. Whitney is a practical oil investigator. Fate, it seems, brought these two men together both for the welfare of the motorist and the future of this organization.

During the world war it was a problem for the export department to ship its orders to its distributors in the various parts of the world, but it was one of the very few firms that was never refused an export license to ship Gastine, even though shipping space was at a premium. This is indeed a record that can only be appreciated by men who have had to do with export shipping.

Recently when the luxury tax was put on automobile accessories, the head office of the Internal Revenue Commission issued a ruling that inasmuch as Gastine was a product to rejuvenate low grades of gasoline it was non-taxable.

Many big corporations, chemists and municipalities use, indorse and recommend Gastine. Some recently added to the list are Wilson & Co., the big Chicago meat packer; the chief of the fire department of Birmingham, the City of Waltham, Mass.; Walter H. Flood, expert chemical engineer of Chicago; Milton Hersey & Co., Ltd., Montreal, Canada. And so on it goes, testimonial after testimonial praising Gastine.

The Philadelphia branch of the War Trade Board indorsed and used Gastine, the indorsement coming unsolicited. Gastine booths were in charge of various salesmen at the following shows last spring: New York, Philadelphia, Boston, Allentown, Paterson and some in the West and in Canada. Thousands of boxes were sold at these shows, resulting in many new customers and also many new dealers.

The sales method of this company is a little peculiar, in that it does not sell its output entirely through wholesalers. The company sells through resident distributors, who in turn sell to jobbers, dealers, garages, etc. Many drug stores have recently taken on the sale of Gastine, as well as hardware, department and general merchandise stores.

AUTOS FOR ORIENT.

Indicating that the peoples of the Orient are rapidly discarding antique methods of transportation and farm operation, two of the big Oriental liners have cleared from Seattle for the Far East with enormous shipments of automobiles and farm machinery.

ORELL SCREW MACHINE PRODUCTS.

The Orell Manufacturing Co., 67 Hampden street, Boston, is prepared to make immediate shipments on all screw machine products for Ford, Dodge, Overland and Hudson cars; flexible shaft drives, swivel joints and fiber pinions.

NEW ERA HAS UNIQUE SPRING TEMPERING DEVICE.

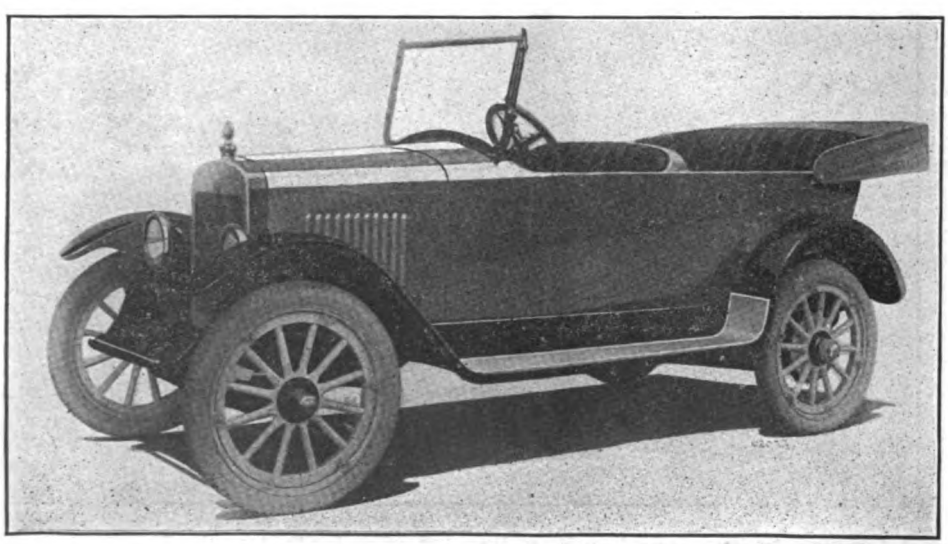
New Era "better" springs are heated in an oven, whose temperature is maintained at exactly the right degree by an electric pyrometer. When the steel shows the right color to the expert oven operator the spring leaves are withdrawn and laid in that wonderful machine, exclusively a piece of New Era mechanism, and shaped and tempered at the same time, in such a manner that every fraction of every inch of the surface gets the same temperature and will touch in a close fit over its whole length, with its sister leaf in the spring, when complete.

It is customary for spring makers to bend the springs into shape, section by section, until the leaves approximately take on the shape required, but because the New Era spring is forced into shape, much as a half of a lemon conforms to the shape of a lemon squeezer, the New Era spring is shaped correctly and tempered uniformly.

The wonderful shaping and tempering machine consists of an endless chain, interspersed at equal distances with spring leaf shapers, which move progressively from the top of a 1500-gallon oil tank down to and across the bottom and up the other side. Each spring former starts with a white hot spring leaf and continues through 1500 gallons of tempered oil, gradually cooling the leaf, giving its temper as well as its shape. When the leaf rises to the top of the fluid it is uniformly shaped and uniformly tempered. The oil in the tempering tank is maintained at a uniform temperature, no matter how many springs are immersed, by a circulating device, whereby cold water comes in contact with the exterior of the oil tank, keeping it cool.

A single machine in the New Era Spring and Specialty Co. has a capacity of tempering and shaping 240,000 complete springs every year. After New Era "better" springs are removed from this shaping and tempering device they are annealed in an annealing furnace to further assure that the springs are properly tempered and will be tough as well as hard. In this annealing furnace, close watch is kept over the process and again the electric pyrometer plays its important part in making "better" springs.

Shape, temper and toughness are the qualities that determine a spring's life, resilience and value. The New Era shaping and tempering machine enables the manufacturer to produce quality springs in a quantity that in turn makes possible a low selling cost and price to the consumer.



New Olympian Touring Car.

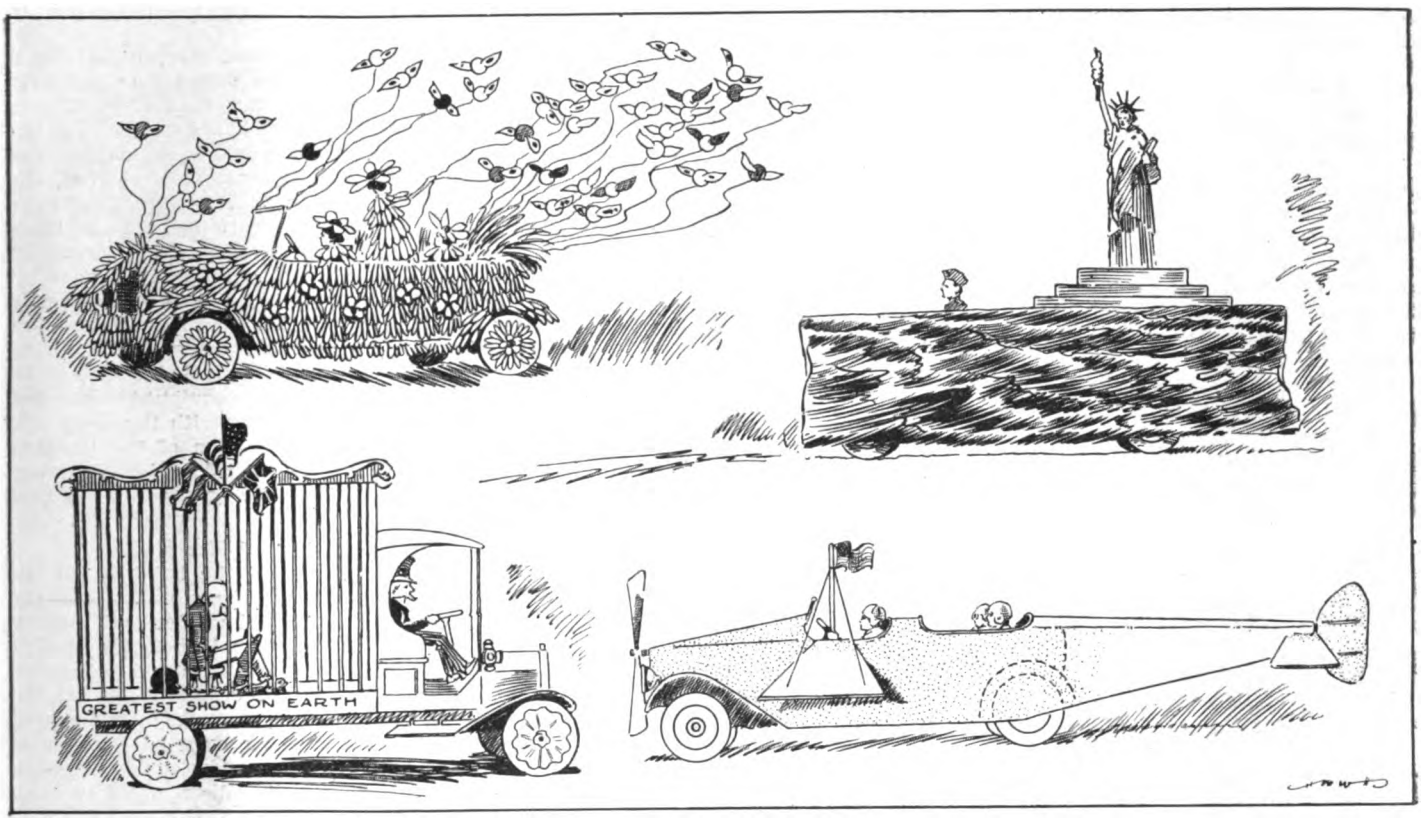
WOODBRIDGE CO. TAKES ON AGENCY FOR OLYMPIAN.

The Woodbridge Co., Inc., Boston, has taken the Olympian agency. The new Olympian, made by the Olympian Motors Co., Pontiac, Mich., sells for $1240 f. o. b. Pontiac. It is a four-cylinder, five-passenger touring car, with streamline body, and has a wheelbase of 112 inches. The engine is valve-in-head type, 3¼x4½, developing 45 horsepower. The car weighs 2150 pounds. The maker claims that the car can be driven from three miles an hour to over 50 miles in high, with 26 miles on a gallon of gas. An Auto-Lite starter with Connecticut ignition is employed.

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SUGGESTIONS FOR FLOATS IN PARADES

As Many of the Processions Will Have Patriotic Aspect, Motorist Must Prepare for Suitable Decorations for His Car.



How Automobiles May Be Transformed Into Attractive Floats for Parades.

THERE will probably be a large number of parades during the next few months to welcome the boys who are coming from "over there" and to celebrate other important occasions. As all of these parades will have a patriotic aspect, the motorist who will participate in them must prepare for suitable decorations for his car.

Any of the ideas carried out in the accompanying sketches will make a car an important feature in a parade. While the fittings may appear to be elaborate, their cost is comparatively small.

In the suggestion of flower gardens with gaily colored butterflies hovering about, the body of the car could be covered with cut green crepe paper dotted with paper flowers. The occupants would have green costumes with flower hats. Colored toy balloons with or without paper wings could be attached to the car by strong thread or string, making a unique and unusual float, one sure to attract much attention.

In the suggestion of the aeroplane, cloth of burlap could be stretched over a high wooden frame with the propeller in front. Care should be taken to avoid having the wings too wide.

The well known tank lends itself nicely to a float. A wooden frame covered with cloth and then painted would give a startling effect of the real thing.

The Goddess of Liberty float is a truck completely covered with cloth painted to represent waves. As the truck moves the canvas, giving way to the breeze, presents a good effect of wavelets.

Of course the spectators will want to see the Kaiser and the illustration puts him in his proper atmosphere.

Another suggestion is to have a truck filled with soldiers in costumes, dating back from the Revolutionary period to the present time. The soldiers could be shown as guarding the American flag. A flagpole could be placed in the center of the truck, but care should be taken that it is not high enough to interfere with trolley wires.

LOCOTRACTOR FOR SOUTH AFRICA'S TRANSPORT PROBLEM.

The importance of cheap and efficient transport for agricultural and other natural products in South Africa is claiming very much wider recognition now that farmers have been invited by the Union government to increase their output and have demonstrated their desire to do so.

It is easy enough to call upon the gasoline driven road tractor to come to their assistance, but unfortunately it can come only at a cost prohibitive to many, states the British and South African Export Gazette. A three-ton gasoline lorry, with gas at 60 cents a gallon will cost $20.68 per day to run. This sum includes wages, fuel, interest, depreciation, repairs, tires and 10 per cent. profit.

The road problem in South Africa is beset with many difficulties. In the rainy season deluges scour and rut the tracks, and in the dry weather surfaces are rapidly disintegrated by vehicular traffic, and high winds get rid of the last vestiges of the "binding."

Now the light railway is advocated as the solution, and suitable motive power is believed to have been definitely discovered in a locotractor, a special form of machine intended to take the place of the locomotive on pioneer light railways. This tractor, in which gasoline has so far been employed, but to which steam and electricity are equally applicable, was some time ago subjected to drastic tests carried out on a trial track, badly constructed by design, and through all these tests the locotractor is said to have come with flying colors.

The locotraction system uses trucks running wholly upon rails. The guiding portion of the locotractor also runs on the rails, but the driving wheels, shod with solid rubber tires, run on prepared strips of road metal on each side of the railway track; thus for a given horsepower and weight the hauling power is four times as great as with ordinary locomotives. Sharp curves, light track and steep gradients are all one to the locotractor.

With these locotractors employed it is calculated that light railways can be constructed for $3850 per mile.

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MAMMOTH PARKING GARAGE FOR BOSTON

Structure, Having Ramps, Will Cost $1,250,000 And Will Be Finest in Country—Buick Also Plans Big Service Station in Hub.

A five-story fireproof garage, which, with the land, will represent an investment of nearly $1,250,000, is to be built on Eliot street next to the Plymouth Theater, Boston, for the Eliot Street Garage Co. The structure will cover more than five-eighths of an acre of ground, and will have more than four acres of floor space, to accommodate 600 cars at a time. A double spiral ramp, one within the other, by which cars will be able to ascend or descend on their own power, is one of the unique features. The George W. Harvey Co. is the contractor, and Clinton J. Warren the architect.

Located in the heart of the theatrical and hotel district and within a few moment's walk of the shopping and financial centers, the garage will serve the various interests, which in rotation require parking space during the day for business men, in the afternoon for shoppers and in the evening for theater goers.

As an added convenience to theater goers it is intended by means of a tunnel to connect the garage with the passageway running through the Little building, which joins the Majestic and Plymouth theaters. In this way theater goers will be able to check their cars and proceed to the theater without going outdoors.

Advantages of Ramp.

The use of the ramp instead of elevators will have a two-fold advantage. It will enable any number of cars to stream in or out of the building on their own power, thus avoiding delays and congestion. During certain periods of the day, especially before and after theater, the movement of several hundred cars in or out, almost at one time, will be necessary. With eight or even 10 elevators long delays would be unavoidable.

Then an important reduction in the cost of maintenance is made possible by use of the ramps. The installation of elevators would add considerably to the annual cost of the building. It is estimated that the cost of operating and repairing these elevators would be in the vicinity of $40,000 a year.

Keeping Cars Moving.

Another interesting feature of the proposed construction is in the use of concrete guides in the spacing of cars. These guides will be shaped like huge flat irons raised 4½ inches over the floor level, four feet wide and 10 feet long. Over this guide the car backs into place. A small bumper will be provided for blocking the rear wheels. In this way a car can back into place only when it is correctly placed.

A scientific plan has also been devised for facilitating the moving of cars in and out of the garage. Near the entrance will be an attache of the garage, who will have in front of him a flashlight device, which will show which berths are vacant and which are occupied. On basis of a vacant space he will hand to the chauffeurs as they pass by a check showing the floor and berth number. On each floor other attaches will guide chauffeurs to their berths, help check robes, etc. Congestion near the entrance will thus be avoided.

Good Location.

The location is easily reached from nearly all of the main arteries of motor traffic entering Boston. It is near Commonwealth avenue, Beacon street, Boylston street and Columbus avenue, and also Pleasant street, which, it is expected, will eventually be the main route of motor travel to the south of the city.

It was not until an intensive study had been made of the probable future growth of the city that the Eliot street site was decided upon. The promoters found that the tendency for expansion was toward the Park square section, which, it is predicted, will shortly become the business center of Boston, as it is along the natural route for growth.

The garage will have an outward appearance not unlike that of a big hotel. The ground space is to be about 27,000 feet, with a 195-foot frontage and a depth of 145 feet.

There will be check rooms and gasoline, oil and air service on each floor, preventing congestion on the ground floor. Once a car starts from a floor there will be no steps on the way out of the garage.

Slight Grade for Ramp.

The ramp will have the slight grade of only one in 14 feet. It will require no more energy to reach the fourth floor than it does to turn around three times in a wide street and will take but a few seconds to go from one floor to the other.

On the ground floor, to the right of the main entrance, will be located the offices, comfortable waiting rooms for women and men and a store for accessories.

The banking firm of Baker, Ayling & Young is representing the financial interests. Architect Warren designed the building, including the ramps, which are patented. The structure will be owned and operated by the Eliot Street Garage Co., which has signed agreements through W. J. McDonald of the John Hancock building and Henderson & Ross of 148 State street, for the purchase of land and buildings which serve as the site for the garage.

The work of construction will begin about June 5 and will necessitate the tearing out of a large number of existing structures on Eliot street and Boylston place.

Finest Parking Garage.

From the standpoint of size, cost and innovations, it is claimed, no garage in Boston, and only a single structure in New York, will even begin to approach the projected building and it will undoubtedly be the finest parking garage in the country.

Plans by Architect Warren call for a steel and reinforced concrete building, which will rest on a foundation of concrete sunk 40 feet below grade. The architect has succeeded in making the building highly ornamental. Over the double entrance on Eliot street for automobiles will be a marquise. The building will be thoroughly fireproof throughout, with metal doors and window frames.

Special precautions have been taken to reduce the fire hazard. A system of fire sprinklers will be provided. In addition the building will be divided by fire walls into three sections equipped with fire doors communicating with the ramp. In case of fire the portion of the building involved will be cut off so that the ramp will be available for egress from the rest of the building.

Use of Floors.

The basement of the building will be used entirely for car storage. On the first floor will be the office and waiting rooms, women's resting room, men's smoking room, lavatories and the accessories store. The second floor will be for auto storage only. Part of the third floor will be given over to chauffeurs' rooms, toilets, shower baths and dressing rooms. The gasoline distributors on each floor will be under a pressure system.

A circular court, 30 feet in diameter, will be in the center of the building, inside the ramp. Illumination will be furnished by a skylight dome on top.

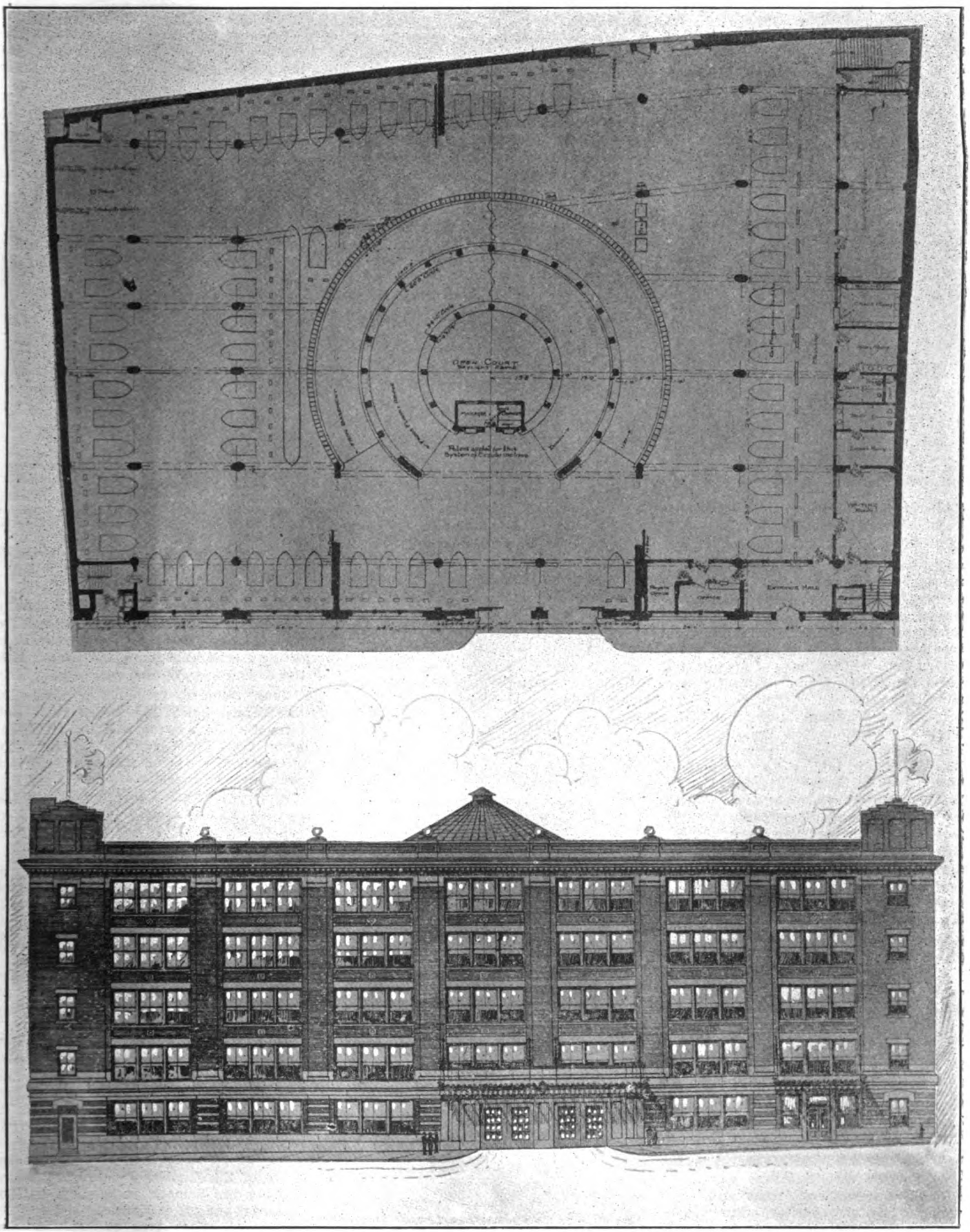
$200,000 SERVICE STATION FOR BOSTON BUICK CO.

Work has been started on a $200,000 service station for the Boston Buick Co., to be located on Babcock street, just off Commonwealth avenue, near Braves' Field. It is said that the structure will be the largest in the United States devoted exclusively to passenger service. The building will have 70,000 square feet of floor space, all of which will be used for service purposes, as the sales department and storage will remain in the present locations. It will have an 86-foot frontage on Babcock street and a depth of 300 feet on a proposed new street.

The Boston Buick Co. owns nine acres of land at the site of the new station and the plans for the building contemplate enlargement when that shall become necessary, without change in the original building.

There will be two stories. On the main floor will be a large testing department, machine shop and wash stand and paint shop. The main repair shop will be on the second floor. There will be no elevators, as the cars will ascend and descend by means of ramps, placed in the center of the building.

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Floor Plan and View of Proposed Garage on Eliot Street, Boston, Which Is Expected to Prove the Finest Parking Structure in This Country. Circular Ramps Will Entirely Replace Elevators. The Building Will Cost $1,250,000.

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Personal News of the Industry in Brief

W. D. Blood is president of W. D. Blood & Co., Inc., 44 Whitehall street, New York, one of the newest organizations to



W. D. Blood, President of W. D. Blood & Co., Export Representative.

take its place among the representative export sales companies. The company is incorporated under the laws of New Jersey and has already made much progress toward establishing a large number of important connections. The principal lines the company will represent in the foreign field will be those of manufacturers of automotive and hardware products. The clients now include the Metz Corporation, Waltham, Mass.; the Corbin Screw Corporation, New Britain, Conn.; the Hawthorne Co., Bridgeport, Conn.; the Witherbee Igniter Co., Springfield, Mass.; the Witherbee Storage Battery Co., Inc., New York, and the L. F. Benton Co., Vergennes, Vt. John C. Gallagher is secretary and treasurer.

W. D. Hopson is now with the General Motors Export Co. as service representative in the Far East and he will soon sail for Shanghai.

V. M. Smith is now general superintendent of the Supreme Motors Corporation, Warren, O.

James E. Kepperley has returned to the Willys-Overland Co., Toledo, as vice president and counsel.

E. B. Wilson, for several years with the Buick Motor Co., is now director of sales for the company.

Fred Tuite is now city sales manager of the Universal Tire Filler Co., 526 Westlake, north, Seattle, Wash.

B. F. Greenstone has become assistant manager to Mat Shiffner, president of the Tire Co., Los Angeles, Cal.

R. E. Gerspacher, formerly district manager in Cleveland, O., for the Michelin Tire Co., Milltown, N. J., has joined the Omaha, Neb., house of the Nebraska Buick Co. as assistant manager. He will also handle the accessory department, both retail and jobbing.

George Schaefer has become service manager of the electrical department of the battery exchange, St. Louis, Mo. He was for many years connected with the Campbell Auto Supply Co.

L. S. Henry, formerly with the Henry Motor Service Co., St. Louis, Mo., has joined the Briscoe Motor Sales Co. as service department manager.

Roy F. Fike has become a stockholder, secretary and general manager of the Apperson agency for Oregon, with headquarters in Portland. The name of the agency has been changed from Apperson Motor Car Co. to the Fike-Horn Motor Car Co., with G. F. Horn as president.

C. A. Cole has become general sales manager for the F. C. Meyer Motor Co., St. Louis, Republic truck dealers. He was formerly in charge of outside territory sales for the company.

S. H. Small has resigned as advertising manager of the L. A. Young Industries, Inc., Detroit, to become associated with the Hesson Tiller and Tractor Corporation, manufacturer of Wheat tractors.

Stanley K. Wallace is now purchasing agent for the G. Norman Baughman Co., Tampa. He succeeds Mr. Pettingill, who has gone into the truck business for himself.

Thomas H. House has been appointed Pacific coast manager of the Republic Motor Truck Co., Inc.

J. Bruce Gronnett, for the past three years wholesale salesman in Ohio for the Studebaker Corporation, is now with Harry A. Nelson, distributor of Saxon cars in northwestern Pennsylvania.

W. F. Rockwell is president and manager of the Wisconsin Parts Co., Oshkosh, Wis., a new corporation, which has purchased the assets of the E. B. Hayes



W. F. Rockwell, President and Manager, Wisconsin Parts Co., Oshkosh, Wis.

Machinery Corporation, Oshkosh. The corporation will manufacture Wisconsin axles on a much more extensive scale.

Edward McNamara is now district sales manager of New York state and the New England states for the Atter-



Edward McNamara, New England District Sales Manager, Atterbury Motor Car Co.

bury Motor Car Co., Buffalo, N. Y., builder of Atterbury trucks.

Edwin A. Godley has been appointed general offices manager of the Republic Motor Truck Co., Inc., Alma, Mich. He was formerly with the eastern division of the Overland Motor Car Co. and with the Olds Motor Works.

John Doherty, formerly president of the Acason Sales Co., Philadelphia, has formed an association with the H. Kleinhans Co., Pittsburgh, and will have charge of the Acason truck sales of this company's business.

C. T. Turner has returned from France and resumed his duties as president and general manager of the Turner & Burkett Sales Co., Toledo.

J. H. Weller, formerly assistant production manager of the Packard Motor Car Co., has been appointed assistant to B. W. Burtsell, president of the Herschell-Spillman Motor Co., North Tonawanda, N. Y., and is in charge of production.

Edward W. Goodwin, engineer of the body division of the Cadillac Motor Car Co., has resigned. He will open an office for car designing, detail and building.

Guy N. Stevens has resigned as assistant secretary of the Olympian Motors Co., Pontiac, Mich., and has been elected vice president and treasurer of the Rex Tool and Machine Co., Pontiac. He is also assistant secretary of the Power Truck and Tractor Co., Detroit.

W. E. Manning is now on the sales force of the Samson Tractor Co., representing the Samson in western half of Missouri and all of Kansas.

Karl A. Eichhorn, formerly of the Packard Motor Car Co., is now manager of the new offices opened in Detroit by James Barr & Co., public accountant, New York.

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George V. Lyons is domestic sales manager of the John Simmons Co., 110 Center street, New York, which has formed



George V. Lyons, Domestic Sales Manager, the John Simmons Co., Jumbo Truck Distributor.

an alliance with the Nelson Motor Truck Co., Sagamore, Mich., whereby the Simmons concern becomes the sales agent for Jumbo trucks in New England, New York, Northern New Jersey and Eastern Pennsylvania and for all export business.

Blaine McGrath, now in the sales department of the Republic Motor Truck Co., has established headquarters at Birmingham, and will cover Alabama and parts of Mississippi, Texas and Florida. He was formerly advertising manager of the company.

Calvert Townley has been elected president of the American Institute of Electrical Engineers. He is assistant to the president of the Westinghouse Electric and Manufacturing Co.

C. C. Thomas has resigned as sales engineer of the Denby Motor Truck Co., Detroit, to join the force of the Field Manufacturing Co., Owosso, Mich.

S. H. Houser, formerly sales manager of the Standley Skid Chain Co., Boone, Ia., has joined the sales force of the Gray-Heath Co., Chicago.

A. E. Mason has become associated with the Western Motor Car Co., Omaha, Neb. He was formerly with the Chalmers Motor Co. as superintendent of sales in Wyoming and Colorado.

F. W. Ramey has been placed in charge of sales at the Cotta Transmission Co., Rockford, Ill. He was recently discharged as a lieutenant from military service.

R. H. Welles is now representative of Charles S. Monson, Detroit, with office in Chicago. He was formerly general manager of the Badger Brass Co., Kenosha, Wis.

William Beckman, formerly experimental engineer with the Duesenberg Motors Corporation, Elizabeth, N. J., has become enginer and eastern representative for the Beckman Metal Products Co., Cleveland.

Earl B. Wilson is now director of sales of the Buick Motor Co., Flint, Mich. He was formerly in charge of the Chicago Buick branch and later was transferred to the Memphis branch. More recently he was manager of the Philadelphia Buick branch.

S. C. Howard has resigned as sales manager of the Cadillac Motor Car Co. to enter business for himself.

Frederick A. Cooks has been elected president of the Biddle Motor Sales Corporation.

G. A. Ungar has resigned as engineer and technical director of the SKF Ball Bearing Co. to become vice president of F. R. Blair & Co., Inc. He will have charge of the sale of Flexite specialties.

Andrew V. Terek has returned to the Bantam Ball Bearing Co., Bantam, Conn., as master mechanic in charge of the upkeep of the factory. He was recently released from the naval aviation service.

W. K. Swigert will have charge of development work of the Dort Motor Co., Flint, Mich. He was formerly superintendent of the Liberty airplane engine division of the Nordyke & Marmon Co.

J. S. Holihan, former sales manager of the Standard Motor Truck Co., Detroit, has joined the sales force of the Garford Motor Truck Co., Lima, O.

F. H. Prescott, recently discharged from government service, has joined the staff of the Remy Electric Co., as designing engineer on motor and generator equipment. He was a designing engineer in the automobile equipment section of the Westinghouse Electric and Manufacturing Co., with which he had been connected about two years, when called to the service, in December, 1917, as a second lieutenant, Engineering Reserve Corps. Most of his work was with the production and inspection of searchlights used by the mobile army and the Coast Artillery Corps.

S. R. Swiss is now advertising manager of the Republic Motor Truck Co.,



S. R. Swiss, Advertising Manager, Republic Motor Truck Co., Alma, Mich.

Alma, Mich. For 11 years he directed the sales and advertising of Red Raven Splits.

Capt. Wakeman Hackett, recently discharged from the service, after returning from France, has become a factory rep-



Capt. Wakeman Hackett, District Sales Manager, Oshkosh Motor Truck Co.

resentative covering the middle west section for the Oshkosh Truck Manufacturing Co., Oshkosh, Wis.

H. E. Westerdale has resigned as sales manager of the Heath-Duplex department of the McCord Co. and with Ward Keller, eastern sales manager, will form the Lexington-Ohio Co., Cleveland. The new firm will handle Lexington cars.

Cliff Knoble and Norton Brotherton have formed a new agency known as the Brotherton-Brown Co., with offices in Detroit. Mr. Knoble was formerly advertising manager of the Liberty Motor Car Co., and Norton Brotherton was formerly of Seelye-Brotherton-Brown.

Earl A. Stone, who was formerly manager of the Detroit branch of the Wheeler-Schebler Carburetor Co., Indianapolis, has been appointed sales manager of the company to succeed George T. Briggs, who has resigned.

G. Elmo Holke, formerly assistant secretory of the National Automobile Dealers' Association, is now assistant advertising manager of the Traffic Motor Truck Corporation, St. Louis, Mo.

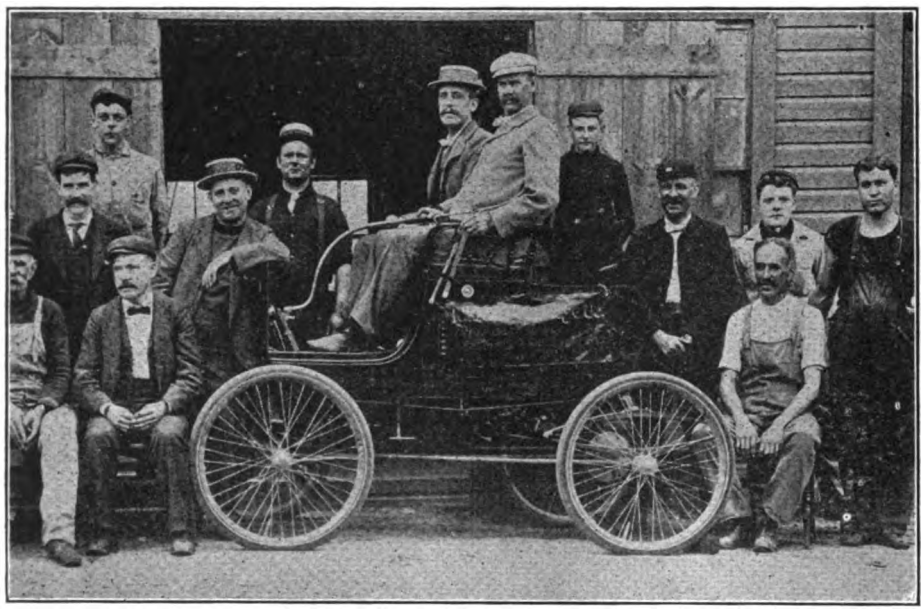
P. F. Minnock has become manager of the Kansas City plant of the Ford company. He was manager of the Des Moines branch for the past 18 months. Until a successor is appointed Mr. Minnock will divide his time between the Des Moines and Kansas City branches.

Steward Slosson, for several years coast representative for Firestone motorcycle tires, has been appointed Pacific coast manager for the Rubber Products Co. The company is increasing its manufacturing and storage space at its Barberton, O., factories. Additional office space is also planned.

Fred W. Thomas has opened an office in Cleveland, O., as consulting engineer. He was formerly chief engineer of the Olympian Motors Co., Pontiac, Mich.

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When the "Horseless Carriage" Was Pride of Motordom Here and In Europe.



The Accompanying Illustration Is of a Photograph Taken 19 Years Ago, in Front of Rhode Island's First "Horseless Carriage" Factory in Providence and Operated by Hughes & Atkin. Now Known as the Wm. Hughes Co., the Oldest Exclusive Reo Car Dealers in New England, Having Taken on Reo Line Some 13 or 14 Years Ago. The "Horseless Carriage" as Shown Here Is One of the 18 Built by Mr. Hughes in 1899 and 1900, the First in New England, for Which He Made Nearly All Parts by Hand. As Late as 13 Months Ago One of These Cars Was Seen Operating on the Highways of Rhode Island.

THE following extracts are taken from an article on "The Motor Vehicle Situation Today," published in a magazine in 1899:

"In New York City today there are about a hundred motor hansom and coupe cabs in public service; about 20 motor wagons are engaged in the delivery of light merchandise and there are between 30 and 50 private motor carriages, usually carrying two passengers. In London there are today about 40 motor coupe cabs in public service and fully three times as many private motor carriages as in New York, and about as many motor delivery wagons. In Paris there are 12 public motor coupe cabs in regular service, a large number of motor delivery wagons and three or four hundred of all types of private motor vehicles.

"Other cities also have motor vehicles in use within their areas, but the three cities mentioned are all that it is necessary to study to indicate the present condition of affairs. In London, Paris and New York every one of the public motor hansom or motor coupe cabs is propelled by the electric system, using electric storage batteries. In New York about 95 per cent. of practical private motor vehicles which are seen upon the streets and in regular use are propelled by gasoline engines. In Boston, where local causes have affected development, steam takes about an even place with gasoline.

"In London not more than 30 per cent. of the private motor vehicles used regularly are propelled by storage batteries. The remaining ones use gasoline engines, or 'petrol motors,' as they have been called. The motor delivery service, both heavy and light, is almost entirely accomplished by steam.

"In Paris about 95 per cent. of the private motor vehicles are propelled by gasoline engines or 'moteurs a petrol.' The same is probably the cause with the motor light delivery wagons. The other five per cent. of all vehicles in use may be safely said to be equally divided between electricity and steam, the latter being almost exclusivey used for heavy traction.

"Of the gasoline engines used on both sides of the Atlantic in regular vehicle service and in the hands of private owners not interested in their manufacture, fully 99 per cent. work on the Otto cycle, with one working impulse for every second revolution per cylinder.

"Last year the best gasoline equipments were made in Europe. Today it is more than probable that the best gasoline equipments can be obtained in America, although it must be understood that there are also inferior ones offered for sale here.

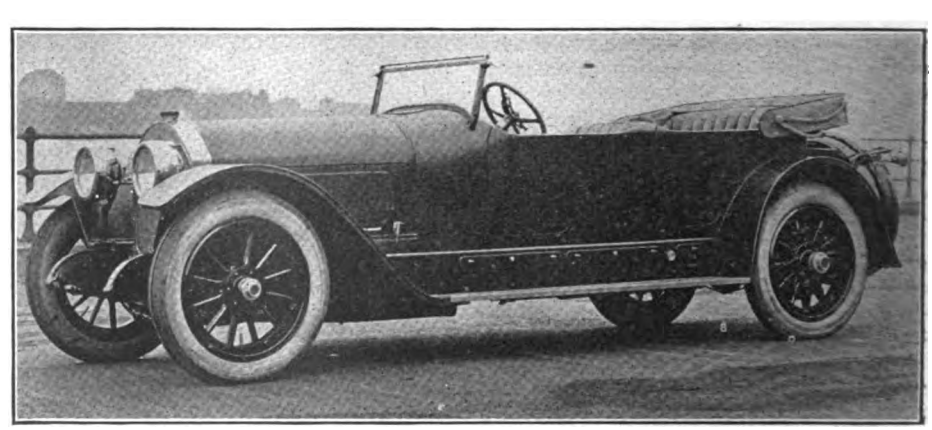
"No generally successful results are being obtained with the gasoline engine where the load to be carried exceeds 1500 pounds. Isolated cases have been recorded, but there is not a great number of machines in every day service. As for steam carriages, these have been produced especially in the vicinity of Boston, in the United States, and, in a few instances, apparently perform the regular service in which light gasoline vehicles elsewhere excel. They are operated by a small steam boiler placed under the seat, and a very small high speed steam engine, geared to the driving axle. The weights are very much less than in the case of the gasoline carriage, some times as much as 50 per cent., and the speeds are very high.

"The gasoline used in the best machines is what is generally known in the trade as 72 degrees. Any gasoline or naphtha is suitable, although that between 68 and 74 degrees gives the best results. This can be purchased thrcughout the United States at a price which averages 15 cents per gallon. In the best gasoline carriages in which two passengers are carried and which, without passengers, weigh about 700 pounds, the consumption of gasoline is, on ordinary country roads, about 0.06 gallon per mile.

"If one wishes to make runs exceeding 30 miles in length, to carry less than 1000 pounds, and to avoid the necessity of having any definite base of supply, either the gasoline carriage will be chosen, thus following 75 per cent. of those who use long distance carriages in the United States, or the steam carriage, which represents the remaining 25 per cent. If he follows the practise in Great Britain the user will buy a gasoline carriage and the same is the case in France."

The foregoing extracts give a fair summary of motor car conditions at that time, and reveal a remarkable contrast to present day affairs, emphasizing the remarkable development that has characterized the industry.

But Now Motorists Have Cars Like This.



Locomobile, Double Cowl, Four-Passenger, Designed by Locomobile Custom Department for Mrs. Samuel P. Sears, Boston.

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DON'T RACE ENGINE WHEN CAR IS STUCK IN SAND.

Knowledge of what should be done when the car becomes stuck in soft earth is something that is bound to prove of benefit to the motorist sooner or later, as it is a predicament that confronts everyone.

"Just remembering that the slower a wheel turns the more traction it has will enable many motorists to avoid the terrors of a self-dug grave when stuck in mud or sand," states the Hudson News Service.

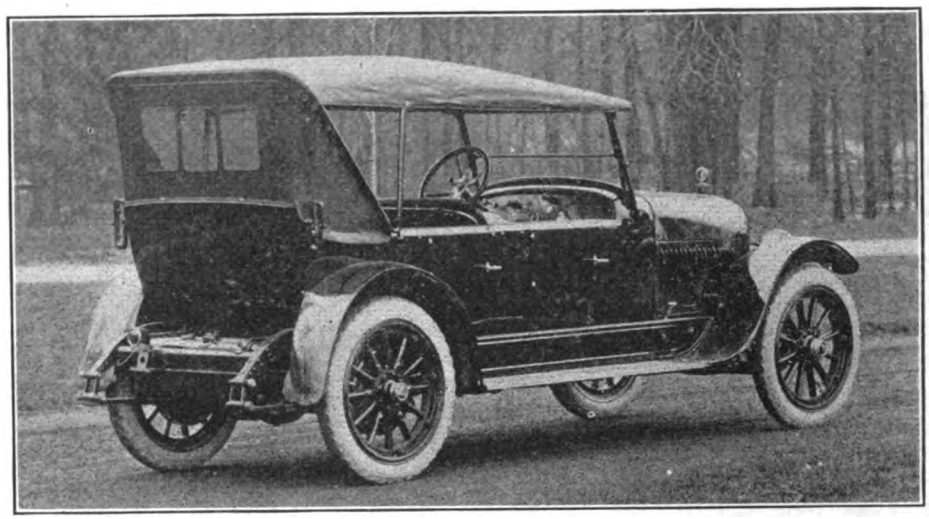
"Nine owners out of 10 when stuck in the mud will put their cars in low gear and then race their engines for dear life, shortening the life of both tire and motor. With the wheels going at such a pace it is impossible to get any traction, even if straw or twigs are placed beneath the treads, and tire chains will be slipped around idly. The effect is usually to dig a deep hole and increase difficulty.

"The correct way is to pack cloth or twigs beneath the wheels, use low gear and only speed the motor sufficiently to take the clutch without stalling. Above all things don't race the engine. Fine cars, like the Hudson Super-Six, have the power to extract themselves from any difficulty if they are only given the chance."

TOURING NOTES.

New York to the Berkshires via Harlem Valley route through Pawling—Good hard surfaced road to Millerton; about one-quarter mile rough dirt road en route to Lakeville; gravel in very good condition to Salisbury, and north to the Massachusetts-Connecticut line; one-half mile which has not yet been top dressed, then excellent macadam road to South Egremont. In fact, practically the same condition maintains through Stockbridge to Pittsfield, although some slight repairs are being made on the road over Monument Mountain between Great Barrington and Stockbridge, but travel is not being interfered with.

New York to the Berkshires via Poughkeepsie, Millbrook, Millerton, etc.—The Albany Post road is in good condition to Poughkeepsie, which remark also applies to the cross connection to Amenia and Millerton, wherefrom the above trip is followed.



New Hudson Super-Six Four-Passenger Phaeton. The Body and Chassis Are Finished in Rich Deep Blue, the Wheels Are Vermillion and the Fenders and Upholstery Are Black. Vermillion Striping Around the Body Level and Hood Serves to Set Off the Beauty and Distinction of the Car's Lines. Special Attention Has Been Paid to Perfection of Detail.

PLAN QUESTIONNARIE FOR EXAMINATION OF AUTO OPERATORS IN NEW YORK CITY

FRANCIS M. HUGO, secretary of state of New York, is drawing up a questionnaire for the written examination of automobile operators of New York City. Indicating what may be expected from his department in so far as the licensing of operators is concerned, he said:

"I desire first and foremost a maximum of safety and a minimum of annoyance to the automobilist. I have no desire, through the questionnaire, to pry into the private affairs of the automobilist any further than is necessary. I do not intend to use a questionnaire any greater in length than is absoluely necessary, nor one which would be irritating to the motorist. But I do expect to formulate one which will cover the ground, and which, embodying many of the excellent suggestions that were the outcome of the first conference in New York, will serve as a substitute for a road examination for operators who have driven their cars year after year in a careful and sane manner.

"The new questionnaire will ask some pointed questions in regard to the use of intoxicants and drugs and false information as conveyed to us by the questionnaire will become a serious offense.

"The questionnaire will be comprehensive and fair to all. The competent operator has nothing to fear, while the incompetent will be forced to raise himself to a higher standard.

"I think that when the law is in full working order we will have the hearty co-operation of 99 per cent. of those who operate cars in the metropolis.

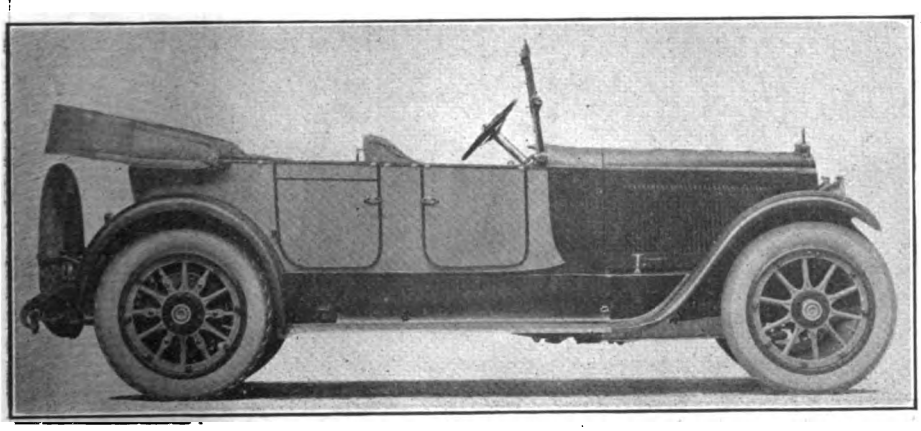
"In 1918 there were 503 persons killed in automobile accidents in New York City, according to figures from the traffic court. During the same time 13,603 persons were injured. In the first two months of this year 59 persons were killed and 1781 were injured.

Would Decrease Accidents.

"While I am perfectly well aware of the fact that many of these accidents were due to the carelessness of the pedestrian, I believe that with this operator's law efficiently enforced and with a greater co-operation on the part of pedestrians, these figures can be brought to show a decrease, despite the fact that the growth of motor vehicles in this state this year is forging ahead by the tens of thousands.

"It is not expected that any process of examination will produce 100 per cent. safety.

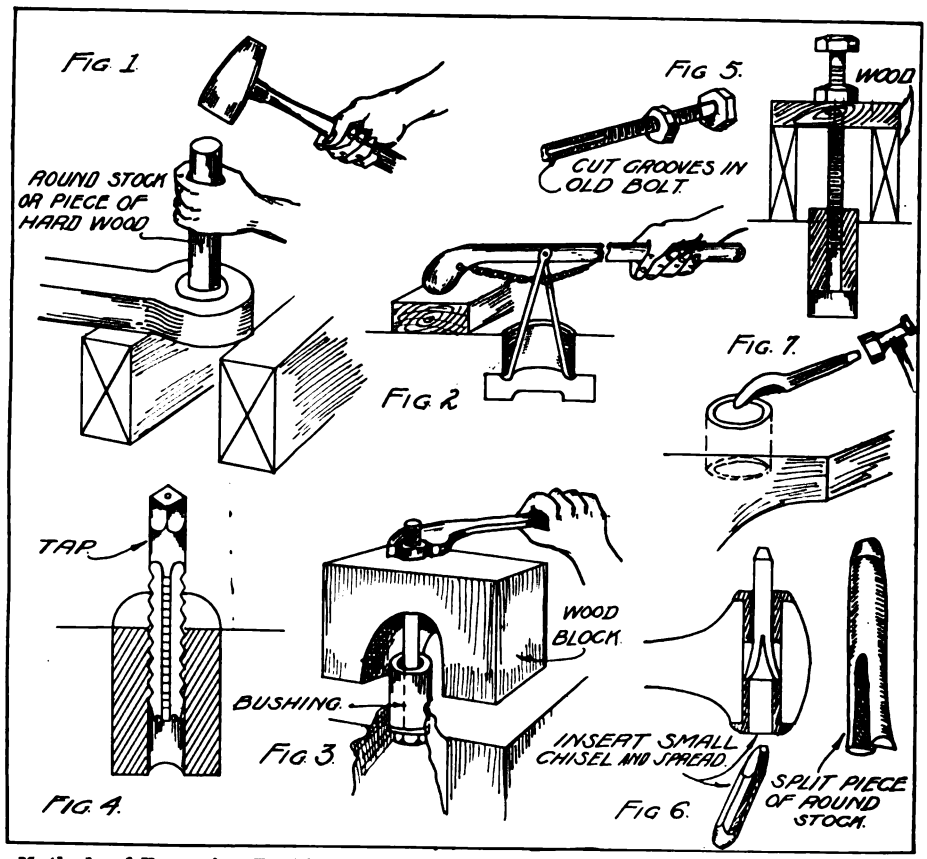
"To supplement the safeguards that this examination is intended to throw around the operation of cars upon the streets of New York City, I intend to hold hearings regularly in New York, where reckless and inefficient operators will have their licenses revoked. I have made arrangements to have the use of one of the rooms of the Court of Special Sessions every Saturday, if necessary, in which to hear charges against operators accused of careless driving or unfitness."



Latest Packard Model Twin-Six, Fitted with Every Up-to-the-Minute Luxury Known to the Motorist. This Car Has Made a Wonderful Appeal.

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PROPER METHOD FOR BUSHING REMOVAL



Methods of Removing Bushings: Fig. 1, Driving with a Wood Block; Fig. 2, Lever Adapted for Lifting Pull; Fig. 3, Drawing with a Block and Bolt Puller; Fig. 4, Tapping a Bushing to Use a Bolt Puller; Fig. 5, Bolt and Nut Adapted as a Puller; Fig. 6, Driving a Bushing with a Split Punch; Fig. 7, Cutting a Bushing to Collapse It.

To know how to remove bushings may serve one well at times. The use of bushings is to compensate wear between two moving parts without replacing the parts.

New bushings can be obtained from vehicle manufacturers or their agents by describing the parts for which they are wanted or making sketches of the places they are supposed to fit.

Figure 1 shows how a bushing may be driven out, when the part in which it is fitted may be taken out and held in a vise, or laid over two blocks. Figure 2 shows a simple home made tool consisting of a bar and two adjustable arms held by light springs, that will allow the arms to swing into place when the lifter is in use.

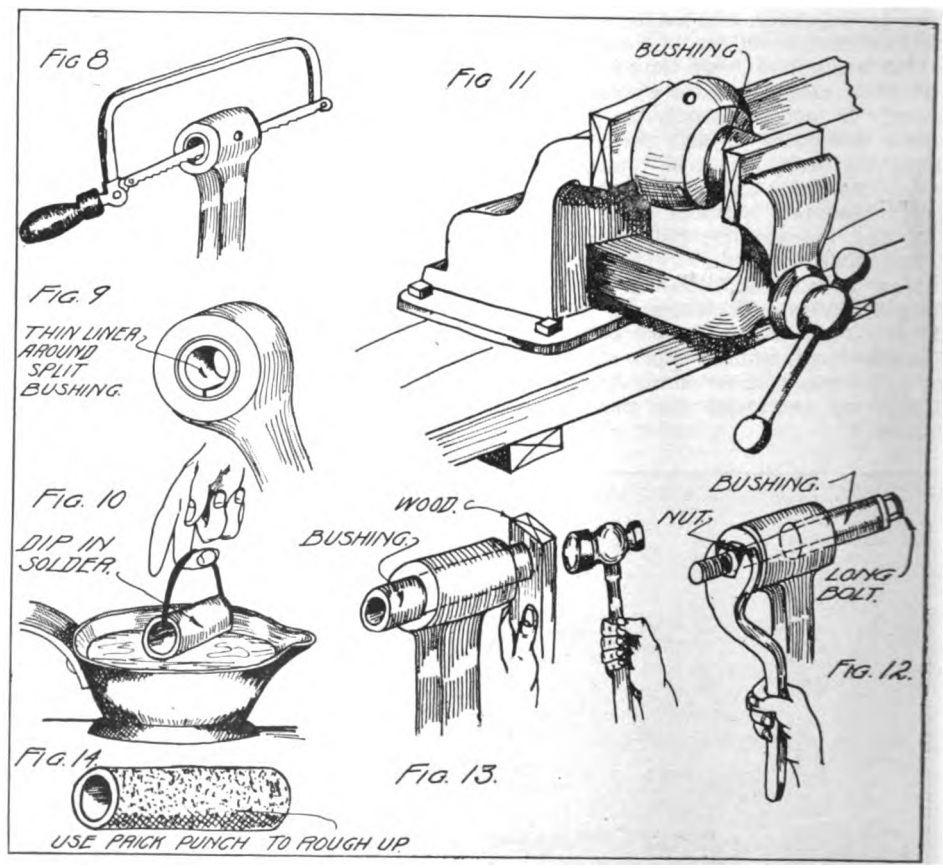
Figure 3 illustrates how a bushing may be pulled with a bolt, nut, washer and three pieces of flat stock. Figures 4 and 5 show the way to quickly extract a small worn out bushing that is set flush with the bottom of the bore. A tap the size of the bore of the bushing is used to make a thread in the bushing. With two blocks of wood and a steel plate with a hole bored through it for the tap to slip through, set the bolt in place as shown in the illustration. After the thread is made in the bushing it will be a very easy matter to withdraw the bushing by means of the nut and bolt.

Figure 6 shows how the bushing may be driven out of steering spindles by means of a split punch and a chisel to spread the split punch after it is in place.

Figure 7 shows the proper way to cut out a bushing with an oil groove chisel. Cut down one side, then collapse the bushing and it will come out very easily. In some cases it may be difficult to get the bushings wanted for a certain place and the original bushings may be utilized. This may be done by putting the part carrying a bushing into a vise as in Figure 8. With a hack saw cut a slot at the bottom clear through the bushing. Pull out the bushing and wrap a thin sheet of brass around it and drive the bushing back into place again, as in Figure 9. A good method sometimes used in emergency cases is to forge out the bushing, clean it with acid and then dip it in a dish of melted solder, as in Figure 10. If only one side is to be cleaned then dip only that side in the acid. In Figures 11, 12 and 13 are shown three methods of forcing bushings back into place, that of using a hammer and a block of wood, using a long bolt and washer and for small parts using a vise, for a screw press.

In Figure 14 is shown a method of roughing a bushing that has become loose in its fixture. The bushing is withdrawn, the outside roughened or burred with a prick punch and is driven in again.

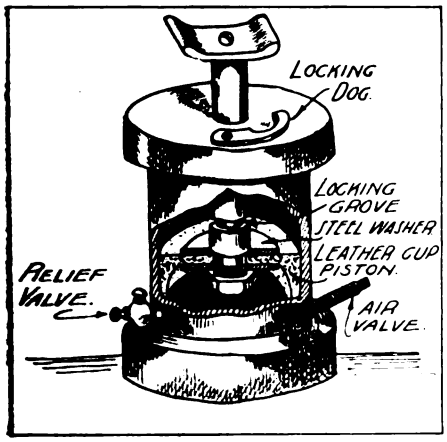
Care should be taken in putting bushings back into place to see that the oil holes line with those in the parts in which they are fitted. Be sure to lubricate carefully all bearings using bushings.



Methods of Removing Bushings: Fig. 8, Cutting with a Hack Saw; Fig. 9, Shimming a Bushing for a Temporary Repair; Fig. 10, Reducing a Bushing Bore with Solder for Emergent Need; Fig. 11, Forcing in a Bushing in a Vise; Fig. 12, Driving in a Bushing; Fig. 13, Bushing Burred with a Punch to Fix It in the Bore.

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SUGGESTIONS FOR CAR OWNERS



PNEUMATIC JACK.

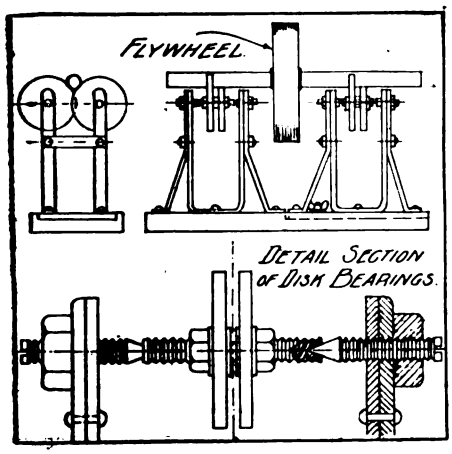
Quick action with little exertion is effected with this jack. It is a pipe cylinder having a pipe cap at each end and carrying a leather cupped piston that holds the standard and crutch for lifting the car. The feature of this jack is the method of locking the standard in the raised position, this being done by a dog snapping into a notch in the standard. The jack is lowered by opening a relief valve.

NEW VULCANIZERS.

The merits of some new vulcanizers in the market should be investigated by the person who lives far from a repair station. Some of them are easily worked and make a very satisfactory patch on a tube.

BALANCING ROLLERS.

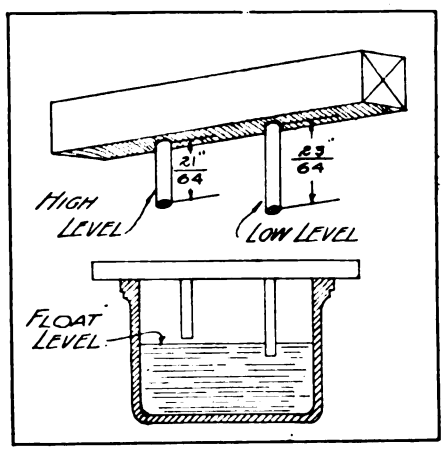
Perfect balance is essential to smooth running in fast rotating parts. Static balance may be determined by resting the part on two frictionless rollers, which permit the heavy part to come to the bottom so that the material may be removed until perfect balance is obtained. The device for testing static balance comprises four sheet steel roller plates mounted on pivot bearings held in a steel frame work. One of the pair of rollers so formed should be fastened to a wooden base by thumb screws so that the rollers may be adjusted to accommodate any length of shaft.



This device will be found very useful in testing flywheels, etc., and as seen in illustration is simple in construction.

CARBURETOR FLOAT LEVEL GAUGE.

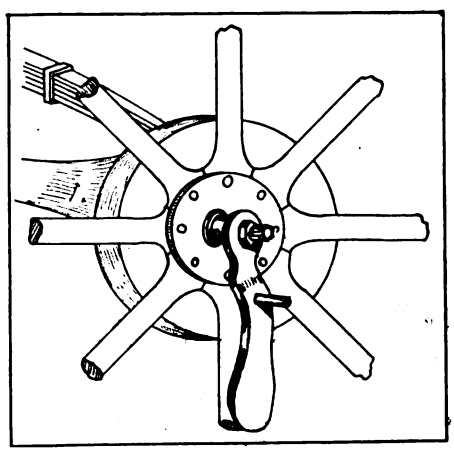
In each type of carburetor the level of the gasoline in the float bowl should be at a certain distance from the machined top of the bowl, this distance depending upon the particular carburetor in question. For most carburetors a gauge may be made that will facilitate the float level setting. A gauge of this type comprises a straight edge wooden block having two nails driven into one face. One nail is cut off 23/64 inch above the wood, the other 21/64 inch. By placing this across the top of the bowl to be tested,



the gasoline level will be between the ends of the two nails when the right height is reached.

REAR AXLE SPEED WRENCH.

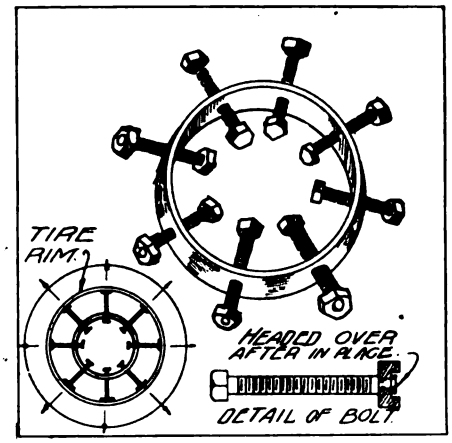
Rear axle nuts may be removed or replaced in an instant by the aid of this speed wrench. The feature of the wrench is the pin in the center of the handle,



which serves as a crank handle, and is used as long as the nut turns easily. The regular handle is used to start or tighten the nut.

RIM EXPANDER.

Occasionally demountable rims will become bent, so that the usual methods of expanding them to grip the tire will not

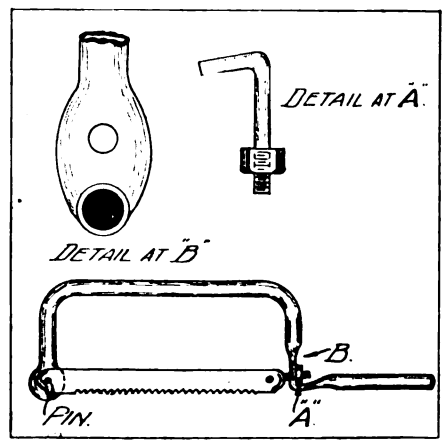


apply. Often a jack may be used, but by applying the force at two opposite points the rim may be still further distorted. By the use of a heavy steel ring, fitted with seven steel bolts, having swivel blocks at the outer ends, force may be applied to the rim in such a manner that it is caused to expand equally, permitting the locking device to be caught.

HOME-MADE HACK SAW FRAME.

A very good hack saw frame can be made from a piece of half inch gas pipe by means of a forge to heat it and a drill to form the necessary holes.

Heat the end of the pipe in the forge and hammer one end down flat. About four inches from this end make a bend at right angle in the pipe. Ten inches from this make a second bend at right angle, parallel with the first. Four. inches from this last bend mark the pipe and heat in the forge. Flatten and drill a hole about one-quarter of an inch in size. Heat again and with a drift punch square this hole and bend the pipe to form a handle. Cut off at the proper length for the handle. At the forward end drill a small hole. Fit a pin to this and head over on one side. This is for one end of the hack saw blade to slip onto. For the opposite end in the bend in the handle use a rod one-quarter inch in size. Bend the end to form a right angle. Thread the other end to take a wing nut. This rod and nut is used to tighten the saw in the frame. The illustration shows this tool in a general way.



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FAKE ARMY OFFICER WHO SPREAD RUMOR U. S. WAS TO SELL WAR CARS ESCAPES

FRANK EDWARD SPEICHER, alleged to have spread stories throughout the country that he was commissioned by the United States Army to sell war cars, is again at liberty. Speicher was an automobile mechanic when he was drafted into the Motor Transport Corps of the army from his home in Arlington, N. J., last June, and sent to Camp Humphries, Va., where he was assigned to the Fifth Engineer Training Battalion. All the officers liked him so well that within a few weeks they made him a sergeant, and he had no trouble in obtaining leave of 10 days when he asked for it soon afterward.

"I want to go to Washington," he said, "and see some friends about a commission."

It was Second Lieut. Speicher that came back to Camp Humphries. He explained to the camp commander that he had taken the oath of office while in Washington, and that he was now a commissioned officer. A few weeks later when a notice, ostensibly from the War Department, reached the camp promoting him to a first lieutenancy he was warmly congratulated.

In a few more weeks First Lieut. Speicher got another 10-day leave and when he came back he wore the silver bars of a captain.

In October of 1918, according to the information of the Military Intelligence Division of the army, the police of Newark, N. J., came down to Camp Humphries and arrested Speicher on a charge of embezzlement. Speicher was released from custody after several prominent Newark men got his bail reduced from $2500 to $1500, but he did not return to Camp Humphries. He had found something a great deal better in Newark.

During his stay there Speicher formed the acquaintance of a group of Newark men who contemplated forming a $2,000,000 syndicate to purchase from the government, after the war, the surplus automobiles and accessories. Speicher made a good impression upon the syndicate, particularly by being suddenly promoted to a majority, whereupon he doffed the silver bars of a captain. The syndicate members took Speicher into their confidence and let him in on the syndicate. Speicher repaid this kindness by taking one of the capitalists down to Camp Holabird, Maryland.

When they got to the Maryland camp Speicher had what seemed to be an order from Gen. Drake of the Motor Transport Corps authorizing him to enter into negotiations for the sale of surplus equipment of the corps, calling specifically for a contract to sell 929 Dodge cars at $400 each and $2,250,000 worth of rubber tires.

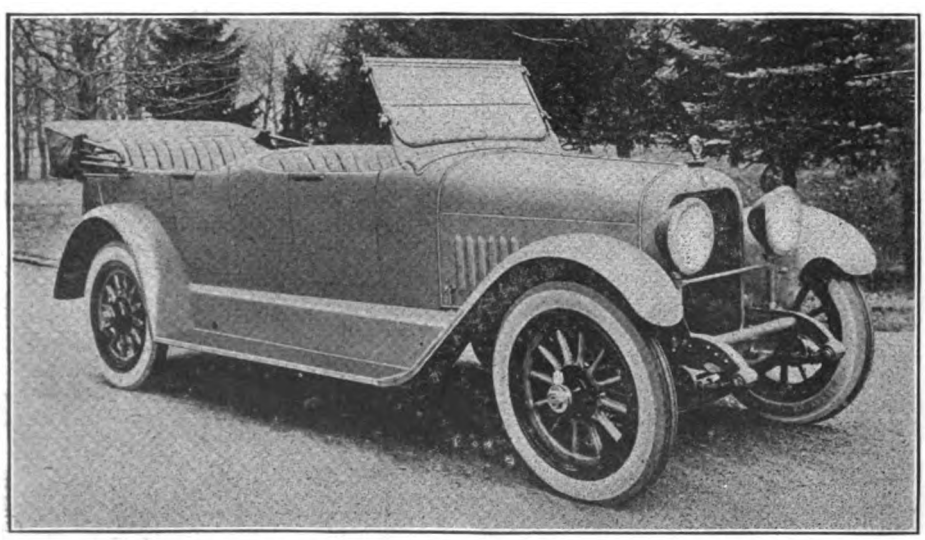
When Speicher next appeared he wore the silver leaf of a lieutenant-colonel. He explained that his work of arranging the sale had gained him another promotion.

The syndicate arranged immediately with a motor car concern to handle its goods and received $15,000 with which to start business. Speicher explained that certain palms in Washington had to be greased in order that the sale might go through without any trouble, and the trusting members of the syndicate gave him $7500. That was the last they ever saw of Speicher.

Early in April the detectives struck Speicher's trail in New York and after a 36-hour chase they arrested him in Danbury, Conn. He was taken to Governor's Island, charged with being a deserter and with having impersonated a commissioned officer with intent to defraud.

This month, during a heavy rain storm and while a dance was going on at the island, Speicher, clad in the uniform of a captain which had been smuggled into him, walked calmly out of his room in the Casual Company guard house, presented an officer's pass at the ferry landing and came to New York. The police and the army have not seen him since.

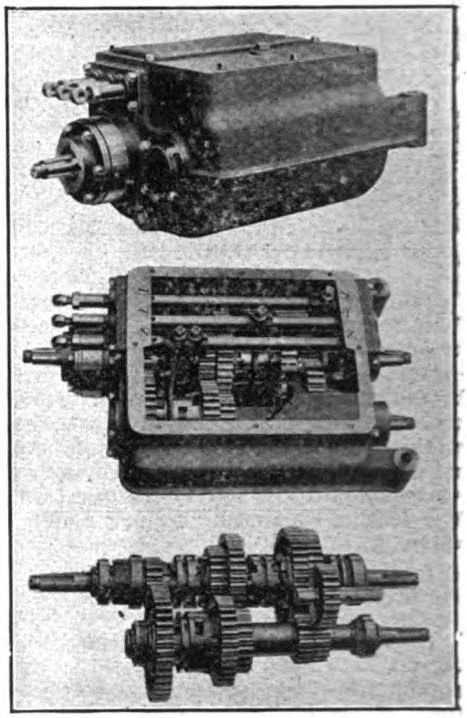
Search for him is now being conducted throughout the entire country.



Mercer Touring Model. This Is Undoubtedly One of the Snappiest Cars of the Season and the Beauty of It Is That It Is as Dependable as It Is Attractive.

New Cotta Four-Speed Transmission Gearset.

THE Cotta Transmission Co., Rockford, Ill., has recently developed a four-speed transmission gearset in which the gears are always in mesh and



The New Cotta Four-Speed Ratio Transmission Gearset. Showing the Complete Unit, the Cover Removed, and the Shaft and Countershaft.

with which it is possible to change speed ratios without shifting gears. This is possible owing to the fact that the jaw clutches are shifted instead of the gears. Transmission gearsets of this type with two and three speed ratios for trucks and tractors have been used successfully for a number of years.

It is claimed that 20,000 trucks, fitted with three-speed Cotta transmission gearset unit, operating on the same principle as the four-speed ratio unit, have been used on the various battle fronts during the world war.

This four-speed transmission gearset possesses exceptional gear ratios, almost providing ideal gear reductions for different speeds. The gear ratios are as follows: Low or first speed, 5.2 to 1; second speed, 3.68 to 1; third speed, 1.86 to 1; direct or fourth speed, 1 to 1, and reverse, 4.666 to 1.

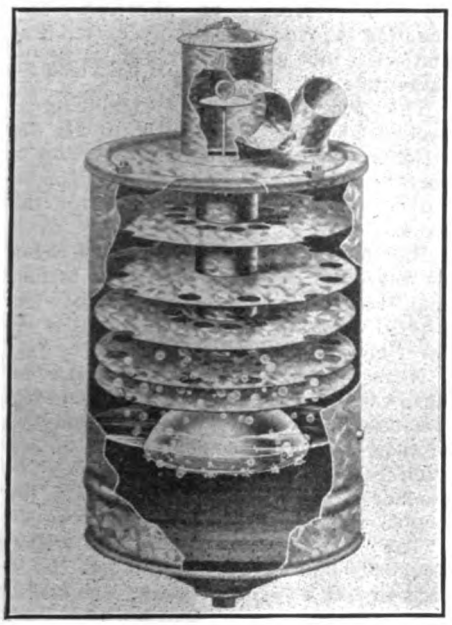
The gear reduction in the second ratio is low enough to start the vehicle under favorable conditions and the low ratio of 5.2 to 1 when conditions are exceptionally bad is the best to use for crawling or where very heavy loads are being moved over rough, sandy or soft surfaces.

The Atlantic Auto Service Association, to manufacture automobiles, etc., has been chartered in Delaware by Jasper Carnin, Arthur Sellers, Harry G. Gooden and David McGinn, Philadelphia.

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Parrett Farm Tractor Has Water Air Washer

THE Parrett 12-25 farm tractor is equipped with a water air washer. Under ordinary operating conditions great quantities of dust and sand



View of Air Washer—Air Enters the Top, Passes Through Inner Tube to Bottom, Where It Is Released Below the Water.

are encountered in the field. Unless adequate precautions are taken, much of this dust and sand will be asperated into the engine, causing excessive wear on the pistons and piston rings, scoring the cylinders and otherwise reducing the efficiency of the engine.

The air washer does away with this trouble by removing all foreign particles from the air before it enters the carburetor. The air washer also improves the combustion of kerosene, since the air passes through the water air cleaner on its way to the carburetor and contains sufficient moisture to insure the good carburetion of the kerosene fuel. It, therefore, dispenses with the extra water tank necessary for injecting water into the manifold and also water needle valve.

The air enters the washer at the top, passes down through the inner tube to the bottom of the washer, where it is released below the water. The air bubbles up through the water and against the baffle plates, which break up the bubbles into fine spray, thus assuring the complete cleansing of the air before it enters the carburetor. A cap is provided at the bottom of the air washer and when this is taken off sediment can be removed.

HOHENTHAL MANAGER AT DETROIT.

The Eisemann Magneto Co. has appointed Elmer H. Hohenthal, who was formerly connected with Bosch Magneto and the Simms Magneto Co., manager of its sales and service branch at Detroit.

SURVEY FINDS NEW ENGLAND ROADS IN GOOD CONDITION FOR MOTORING

FROM a recent survey of New England roads, made by the chief roadman of the Automobile Club of America, the report is as follows:

The Boston Post Road between New York and New Haven is free from road construction and in good condition. From New Haven through Saybrook to New London is also very good and the old railroad bridge at New London, which was bought over by the municipality, we are in hopes will be ready for vehicular traffic about Aug. 1, as the approaches both on the New London and Groton side are now being constructed and when finished will eliminate the delay caused by the ferry across to Groton. However, the ferries are now being operated by the municipality and two good sized boats are running, giving excellent service. The road is under construction between Groton and Poquonoc and in a few days will be entirely closed.

Good Macadam Roads.

An excellent alternate route which will serve as a detour is to continue straight on down to Eastern Point and then around over the Shore Road to Poquonoc, which is good macadam. There is also a good macadam road which follows the beach all the way around into Mystic, which eliminates Fort Hill entirely. From there on all the way to Providence the road is in good condition, providing the motorist goes from Wakefield to East Greenwich over the Tower Hill Road.

Some construction work is going on between Narragansett Pier and Saunderstown, where a fair detour has been provided and should be finished before the touring season is well under way. From Providence to Boston the road is in excellent condition and from New Haven through Meriden and over the Berlin Turnpike to Hartford is in good condition also. The route from Waterbury to Hartford via Southington Mountain and Plainville is good, as is also the direct cross connection between Waterbury and Middletown via Milldale and Meriden.

Boston to Portland.

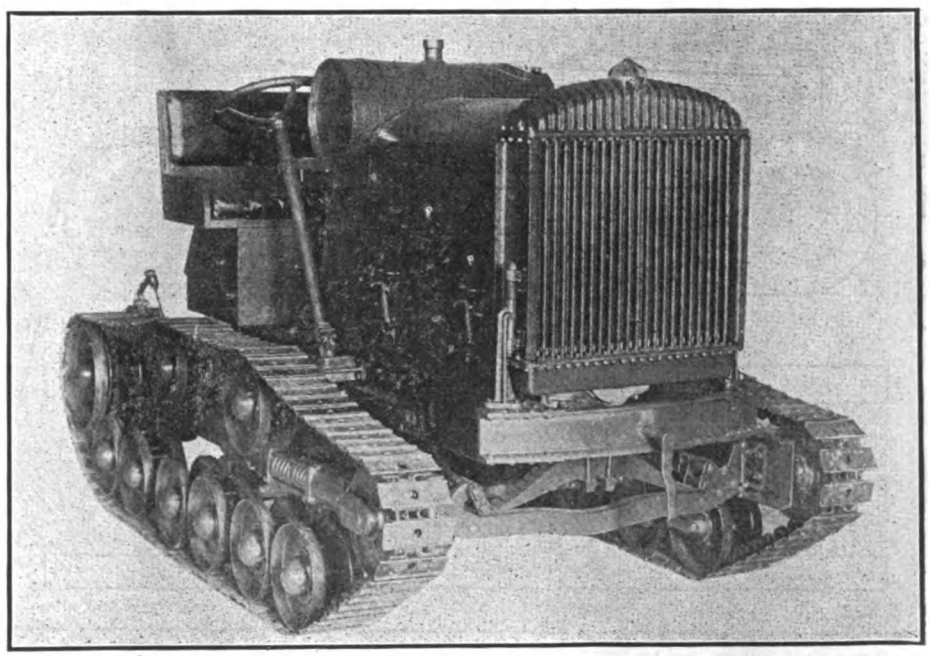
From Boston all the way to Portland, both via the Shore Road and the Newburyport Turnpike is now open and free from construction work. All the frost is out of the ground throughout the State of Maine and the roads which have been recently worked are apt to be soft and heavy in wet weather. The Maine roads are just as good now as they will be at any time during the summer. A considerable amcunt of road building and new construction will take place during the summer months in Maine.

The three trunk lines running north through the State of New Hampshire, including the Franconia, Crawford and Pinkham Notches, are now open with good road surface.

The route up the Connecticut Valley to Dixville Notch and then down through the Androscoggin Valley back to Gorham can be traversed without any difficulty and has become very popular with the motorist during the last three years. A great many motorists are now running up to Belgrade and Rangeley Lakes, also Bretton Woods and Poland Springs.

CHICAGO AUTO DEALER SELLS 40 PLANES IN WEEK.

A Chicago automobile dealer who has added airplanes to his stock announced that at the end of the first week he had sold 40 planes. He bought 150 Canadian army training planes and made Chicago the first commercial airplane selling center in the country.



Martin Track-Laying Type of Tractor on Which Both Axles Are Spring Mounted and the Tracks Are Provided with Spring Tension Member to Remove Obstructions.

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CHANGES MADE IN MAINE AUTO LAWS.

Briefly stated, the changes made in the Maine automobile laws at the recent session of the Legislature were as follows:

Makes no charge for registration of automobiles owned by the state, county, municipality and water districts, but stipulates that such automobiles shall have markers approved by the secretary of state.

Increases the speed limit in the open country to 35 miles and increases the maximum penalty for fast and reckless driving.

Puts the registration of trucks on the carrying capacity, those of a ton and less to pay a fee of $10 and from that up to and including five tons, $5 for each additional ton and up to 10 tons $15 a ton is added.

Provides for the operator of a motorcycle to take out an operator's license. Heretofore the registration has carried with it the right to operate without additional charge.

Makes it imperative for the applicant for registration to state whether his automobile is equipped with lights in conformity with the rules and regulations promulgated by the Public Utilities Commission.

If registration plates are lost in transportation the secretary of state is to issue a new set without additional charge and the provision as to temporary license is repealed in its entirety.

Makes a more stringent penalty for persons convicted of operating a motor vehicle while under the influence of intoxicating liquors, his license to be revoked by the secretary of state and not to be renewed for three years.

Gives the operator of an automobile an opportunity for a public hearing before the secretary of state, either through himself or counsel. The secretary of state, before revoking any license, is to notify the operator by registered mail. The operator has the right to appeal to the Public Utilities Commission.

RUESCHAW SAYS SHORTAGE OF CARS WILL CONTINUE.

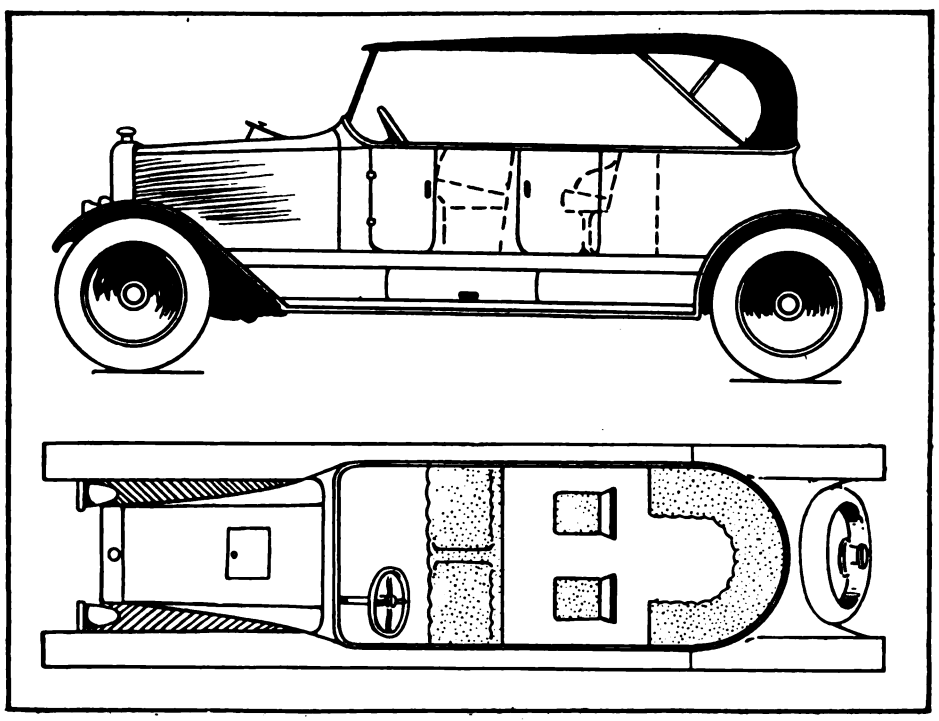
R. C. Rueschew, vice president of the Mitchell Motors Co., Racine, Wis., states



R. C. Rueschaw.

that the demand for cars has increased even greater than the production, and that the outlook now is that the shortage will not be relieved for a number of months to come.

"It is a peculiarity of such a shortage," he says, "that instead of dampening the desire of the people to own cars the desire is increased when they find difficulty in getting them."



Rear Seat Shaped as in Motor Launch, Resulting in the Car Providing Seating Accommodations for Eight Persons. This Type Might Prove Desirable for Jitneys or for Car Owners Who Have Large Families.

REPLACING BROKEN WINDOWS IN AUTOMOBILES.

Machines of the limousine, landaulet or sedan type have permanent winter tops and glass windows. When a pane of glass is broken, of course, there is nothing to do but buy a new pane and put it in or have a glazer do it.

But machines of the more common, less expensive "open" type have windows made of a material known to the trade as transparent sheeting. This sheeting is made on a soluble cotton base and while not so brittle as glass, at the same time it is breakable.

The ordinary way of replacing a broken sheeting window is to rip the stitching that secures it to the top or curtain and insert a new pane. Top repairers charge several dollars for this work.

But there is a much simpler and cheaper way—one so simple and easy, in fact, that the car owner can do it himself in a very few minutes, if he is careful to get the right materials.

It is becoming common practise for hardware stores to carry transparent sheeting in stock for the accommodation of their customers desiring to make just such repairs. A piece large enough to replace a broken light costs but a few cents.

The windows are sewed in with a double row of stitches. First cut the inside row of stitching. Leave the second row. Then cut out the broken light, leaving a strip about one-half inch wide all around and held in place by the stitching left intact. Cut the new pane the right size and cement it to the edges left on the old pane.

This method makes the cost of the replacement less than $1. The success of the method depends on using the right kind of cement; in short, one made on a pyroxyline base. This is because the cement and the transparent sheeting are both made of the same ingredients. Cotton is the base. A pyroxyline cement combines with the sheeting in such a way that the two pieces of sheeting become a practically homogeneous unit.

Glues, cements and pastes made on other bases do not combine with the sheeting; hence the joint cannot be made as securely with them.

ROAD NOTES.

New York to Delaware Water Gap via Goshen and Port Jervis—Hard surfaced road, which averages good—slight repairs being made at a couple of places, e. g., between Southfields and Harriman and between Port Jervis and Milford, Pa.

New York to Delaware Water Gap via Morristown—Hard surfaced road which averages good; condition over Schooley Mountain considerably superior to previous seasons; short section of unimproved surface along the Delaware river to Delaware Water Gap, which would cause no inconvenience except perhaps after rain.

New York to Trenton—The route most generally favored at this time is that via Newark, New Brunswick and Hightstown.

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OVERHAULING THE BUICK

THE overhaul of Buick cars suggested in this article applies to the models built from 1914 to 1918. In general design the various models are similar in engine and chassis construction for the four and six-cylinder machines, and changes made from year to year have been more in the refinements, such as quieting the engines, new body designs, simplifying the starting and lighting systems and changing the rear axles from semi-floating to full floating.

The cooling system includes the radiator, water circulating pump, water connections and radiator fan. The radiator consists of an upper and lower tank connected by a large number of narrow passages in the cellular core. The hot water from the motor enters the upper tank and gradually flows through the passages in the core to the lower tank, while a current of cool air is circulated through the opening in the core by the radiator fan. An enameled metal shell encloses the radiator and supports it on the frame of the car.

The water pump is a centrifugal type and consists of an impellor with curved blades fastened to the shaft by a taper pin, and a loose fitting air tight casting, with inlet and outlet connections, bolted to the motor crank case. As the impellor revolves it sucks in water from the bottom of the radiator to the center of the impellor, and by centrifugal force throws it off at the outer ends of the blades and out of the casing into the cylinder water jackets. The bearings of the water pump are fitted with stuffing nuts and should be repacked with graphited wicking when they leak. No other lubrication is necessary.

Testing the Radiator.

This construction is identical in all the chassis referred to in this article, and the following statements apply to all. To test the radiator, drain out the water, disconnect the hose connections, loosen the brace rod that extends from the radiator to the dash, remove the bolts that secure the radiator to the frame and take the radiator off. Close the inlet and outlet with plugs of wood driven into them, or fit pieces of tin the size of the openings and solder the edges to make them air tight. A special filling cap should be made with an ordinary tire valve stem soldered in the center.

This valve is for connecting an air pump. The overflow should be plugged or closed. Connect an air pump to the tire valve on the filling cap and place the radiator in a tank of water deep enough to cover it. Pump air into the radiator until a pressure of several pounds has been obtained. If there are leaks these will be shown by air bubbles in the water. Mark these leaks with a scraper. Care should be exercised not to put too much pressure in the radiator.

Leaks may be soldered with a soldering iron and blow torch. If the radiator is tight place it on the bench and fill it with a solution of hot water and washing soda. Allow it to stand about 10 minutes and drain the solution and thoroughly rinse it with cold water two or three times. Remove the plugs or tire caps. The cleaning with soda will remove all the sediment and scale.

The pump should be examined and worn packings in the stuffing nuts should be replaced with new if the stuffing boxes are leaking. Replace the hose connections with new if they are soft and spongy.

The radiator fan is mounted on the front end of the motor and is driven by a belt from the camshaft. It should be lubricated at frequent intervals by introducing oil through the hole in the fan hub. The belt can be tightened by loosening the clamp bolt and swinging the bracket.

Removing the Engine.

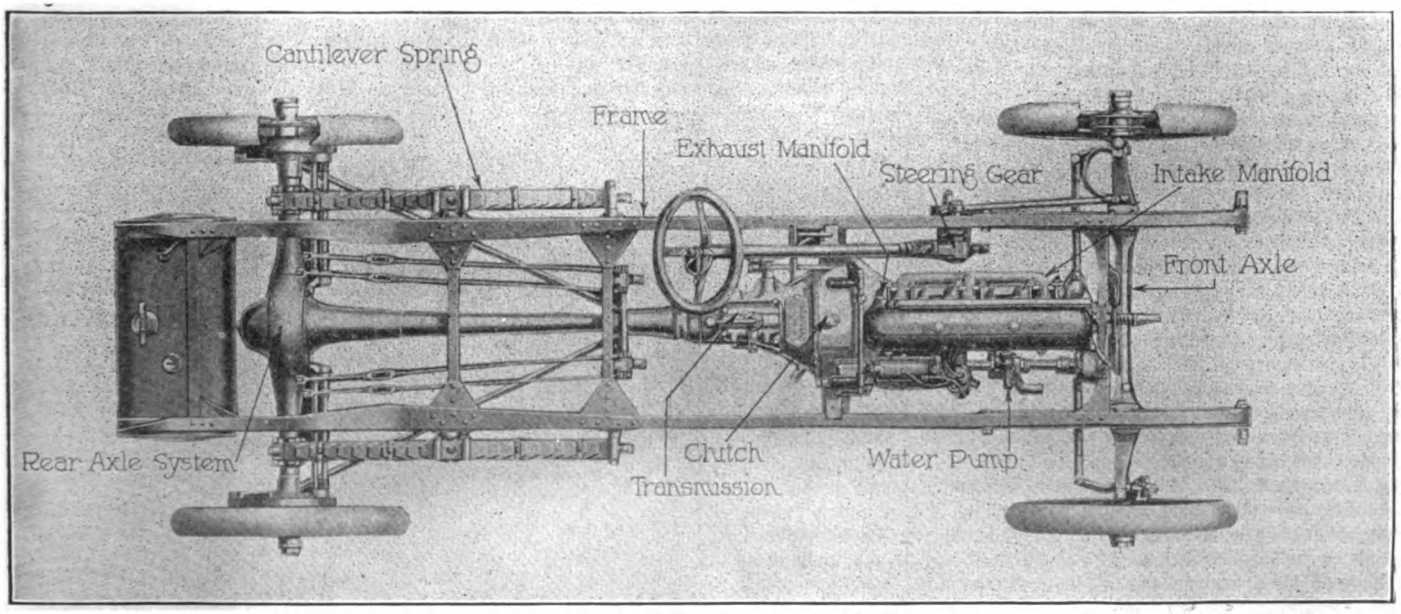
If a partial overhaul is all that is required it will not be necessary to remove the engine from the frame, but if a thorough job is to be done the engine had best be taken out. To do this, loosen the water manifold connections at the top and side of the engine, and disconnect all wires from the motor and motor generator, tagging them and laying them back against the dash. Disconnect the feed pipe from main fuel tank, remove vacuum tank and carburetor. The exhaust and intake manifolds will be loosened at the same time as the stirrups, held in place by two bolts each; secure both manifolds to the engine blocks. Remove the fan and disconnect the oil pipes from the dash and base of engine if the engine has a sight feed. Loosen the emergency and gear shift levers and clutch and service brake. Remove the motor generator and its wiring from the side of the engine.

The engine is now ready for removal from the frame and can be taken out by a block tackle and a sling. Hang the tackle from a beam in the garage and run the car under it. Pass a rope around the engine at its center, making two loops and spreading the loops apart at the bottom.

Bring the loops together at the top in the form of a diagonal cross and hook the tackle into this cross and hoist the engine clear of the frame. Run the car from underneath it and lower the engine onto a stand, setting it in such a position that it can be readily got at from all sides.

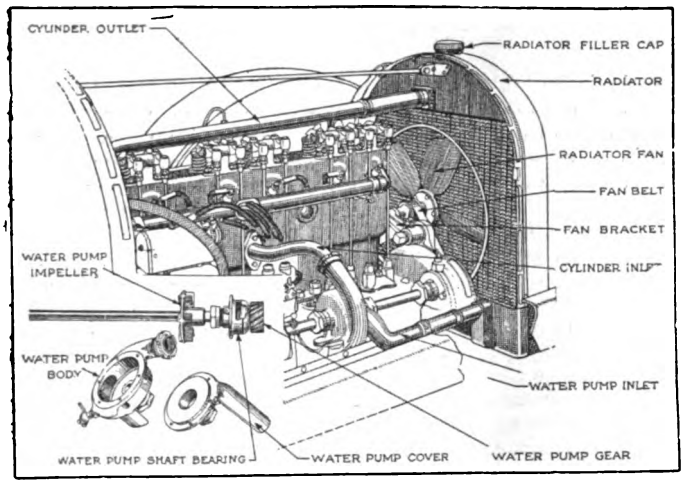
The clutch and transmission can be removed from the engine base by loosening the bolts that hold the housing in which they are contained, and after disconnecting the lever at the side that throws the starting gear into mesh, the clutch case can be removed. The clutch may be slipped off the end of the flywheel hub for examination. In cars from 1914-1917 the clutch is a leather faced cone, but on later models a disc type was used.

The first work is grinding the valves.



General Chassis View.

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Cooling System.

The valves in all models are in the heads of the engines and are held in place by cages and locking rings. To release the valves depress the rocker arms one at a time and the push rods can be taken out. With a drift wrench the locking rings over the cages can be unscrewed. On lifting these small bronze rings can be seen resting on the top edges of the cages. Pick these out, being careful not to damage them, as they can be used again. With a hammer strike the valve stems on the tops to loosen the cages. The cage can then be taken out. Do not take them from the bores.

Beginning with the valve nearest the radiator, take the valve and cage to the work bench and depress the spring against the edge of the bench until the locking key is released. Take out the key and the spring can be slipped off the stem of the valve. Examine the valve and its seat in the cage for pits or accumulations of carbon. Scrape off the carbon. A putty knife can be used for this work. If the seat is pitted deeply the valve can be trued either in a lathe or with a valve facing tool. If the seat in the cage is deep, instead of using a reseating tool it would be better to buy a new cage. If the valve is badly worn or has a bent stem that cannot be straightened easily, it will be wiser to put in a new stem.

In grinding the valves, smear the face of a valve and the seat in the cage with a good grinding compound, preferably not emery. A spring may be slipped over the stem so that when the valve is in place in the cage the spring tension will lift the valve as desired. Hold the stem of the valve in the jaw of a vise and with the hand give the cage a rotary motion back and forth. After grinding a few moments, take out the valve and wipe off the abrasive material. Continue the operation till a ring 1/32 of an inch wide surrounds the face of the valve and the seat. This ring should be free from grooves or pits to be gas tight. There are three grades of prepared grinding compounds, No. 1, No. 2 and No. 3. The first is coarse and cuts heavily; the second does not cut as rapidly, and the finish is made with third, which polishes.

Repeat the process till all the valves are ground. Be sure that all of the grinding compound is removed from valves and seats before replacing them in the cylinders. A good plan is to wash them with kerosene to be sure they are clean. Place them in the cylinders in the order they were removed. Or if you wish to put them in later, tag them inlet and exhaust and the cylinders from which they came, 1, 2, 3, 4, 5 or 6.

The carbon can be removed at this time, either with a scraper that can be bent into many shapes or burned out with an oxy-acetylene outfit. Either will serve and choice may be merely which is handiest.

The bearings should next receive attention. On all models of Buick cars the engine bearings are reached by unbolting the lower half of the crank case and dropping it down. The oil pump can be taken out at the same time. Previous to taking off the engine base draw off the oil at the plug in the oil well. This oil may be strained and used about other parts of the car. With the base removed the main bearings and connecting rods are accessible.

In taking up the main bearings one should be fitted at a time and then loosened until the shaft is free and turns easily. Take each in turn in like manner till the three bearings have been adjusted. Fit the connecting rods similarly, taking up one at a time and then loosening it to take up the next. The bearings are loosened so the crankshaft may be turned easily while taking up the others.

A sharp metallic knock in the motor, audible at every revolution of the crankshaft, usually means a loose bearing. When a loose bearing is found it can be taken up by removing the cap and taking out one or more shims. The same adjustment can be made to the connecting rod bearings. Note that bearings are bright and show no lack of lubrication.

Fitting New Piston Rings.

If you wish to go still further and examine the pistons, they can be taken out through the base of the engine by disconnecting the bearings. The rings should be examined for black spots. These show gas that has blown by, causing low compression and perhaps excessive wear of the pistons, which may cause piston slap. If the rings leak it will be well to fit new ones.

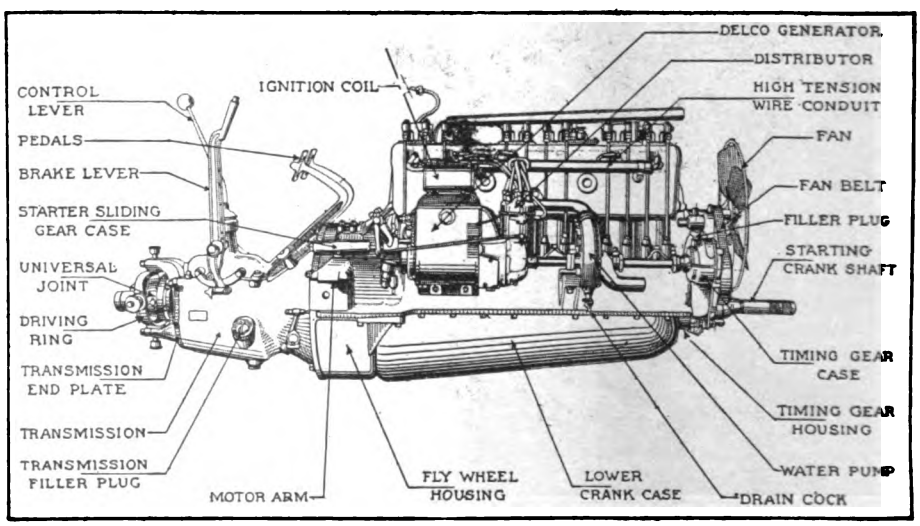
In taking the old rings from the pistons thin strips of metal should be used. Slide them under the rings, one ring at a time, till the three are removed. Clean the grooves of carbon and fit the new rings one at a time to the outer edge of the groove. If too thick rub them on a piece of emery cloth tacked to a flat surface till they fit the groove with a slight drag. Keep each ring separate for the groove to which it has been fitted. In fitting to the groove finally, slip the rings over the piston, using the metal strips to slide them over.

In fitting the rings to the cylinders slip each into a cylinder with the hand for about two inches, keeping it parallel with the face of the opening of the cylinder. If the ends of the ring lap take it out and place it in a vise having jaws of brass or some other material that will not crush or mar it. With a file dress off the ends a litle and try it in the cylinder again. Repeat the operation till the ends have about 1/16 inch opening between them. Put rings on pistons in same manner the old rings were removed.

The pistons can be put in the bottoms of the cylinders, but it is much easier to put them in with the block removed and turned upside down. The cylinders can be examined to better advantage for scored walls while the block is in this position. If scores or scratches are found they may be treated by the patented process known as plating, repaired by welding, or, better still, by reboring and fitting oversize pistons. If the last method is decided on the other cylinders should be rebored so that the engine when running will balance.

Fitting New Gaskets.

In assembling the engine care should be taken to see that every part is fitted and is tight. Where lock wires were cut in disassembling new wires should be placed when assembling. This applies especially to the bolt heads of the main



Generator Side of Power Plant.

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and connecting rod bearings. In assembling, if the gaskets are broken or weak, new gaskets should be fitted. Gaskets for the base of the cylinders and crank case can be made from heavy brown wrapping paper. Punch holes through the paper where holes for studs or bolts are to be made and put in bolts or taper punches to hold the paper while cutting the gasket.

With the pean end of a machinist's hammer mark the holes and use the flat end for marking and cutting the edges. Strike light blows with the hammer and very quickly gaskets of large size can be cut. For the smaller gaskets, such as under water connections, exhaust and carburetor manifolds, either the prepared copper or brass asbestos gaskets or Mobolene packing can be used. Packings made from Mobolene may be cut out in the same manner as those from the wrapping paper by laying the material over the surface to be fitted, marking it with a hammer and cutting it out with a knife.

In putting in the valves with their cages fit them in reverse of the order they were taken out, replacing the bronze rings and locking rings, and tightening the locking rings with a drift wrench, till the rings are absolutely gas tight. The springs and keys should be put on at the bench before the cages are placed in the cylinders.

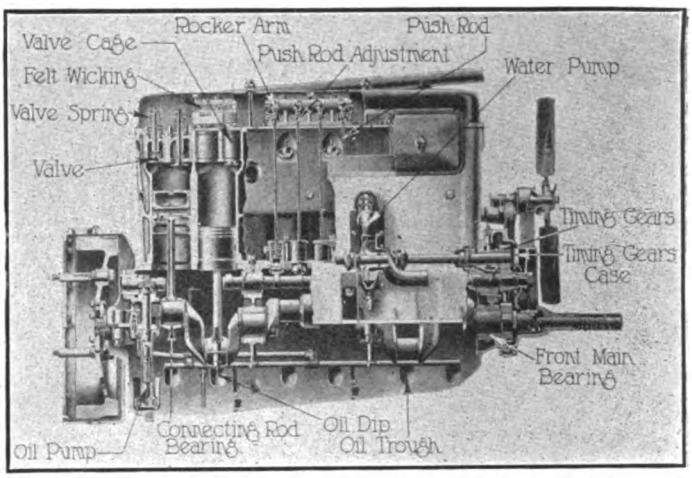
Oil each bearing with a few squirts of oil and oil each part where an adjustment has been made, as the engine will work much better when started if this is done. Put the crank case base in place and tighten the nuts on the gasket, taking the nuts opposite one another first and following by taking them up evenly all the way around.

See that the pump shaft is aligned and coupled while putting the base in place, and that it does not bind. Then screw in the drain out plug in the crank case base and fill the reservoir with oil, putting in about a quart more than is needed in ordinary use. This is needed for the tight bearings.

The carburetor as used on Buick cars is the Marvel model E, made by the Marvel Carburetor Co., Flint, Mich. This carburetor is simple in construction and only two adjustments are required in setting it. The needle valve is placed at the bottom and the air adjustment is a knurled nut on the side above the float chamber. In making adjustments start with the needle valve A and turn it to the right until it is completely closed and turn the air adjustment B to the left until it stops. Now give air adjusting screw B three complete turns to the right and open the needle valve A two complete turns to the left. Start the engine as usual, using the strangler button to get a rich mixture at first. Close the throttle until the engine runs slowly and verify the needle valve adjustment A by turning it to the right a little at a time (½ to ¾ of a turn at a time should be sufficient) until engine runs smoothly and evenly. At this point engine should be allowed to run until thoroughly warmed.

After the engine has warmed turn the air valve adjusting screw B to the left a little at a time until the motor begins to lose speed. This indicates that air valve spring is too loose. Turn it back to the right just enough to make the engine run well. To test the adjustment, advance the spark and open the throttle quickly. The motor should "take hold" instantly and accelerate at once. If it misses or pops back in the carburetor, open the needle valve A slightly by turning it to the left. Do not move the air adjusting screw B more unless it appears absolutely necessary.

The best possible adjustment has been secured when the air adjustment B is turned as far as possible to the left and the needle valve A is turned as far as possible to the right, providing the engine runs smoothly and picks up quickly when the throttle is opened.



Interior Construction of Motor.

The first and most important thing to learn about the carburetor is to let it alone as long as it frictions well. Never tamper with the carburetor until you are sure that your engine has good compression, a good hot spark is occurring in each cylinder at the right time and the tank is full of gasoline. The carburetor should be the last thing touched.

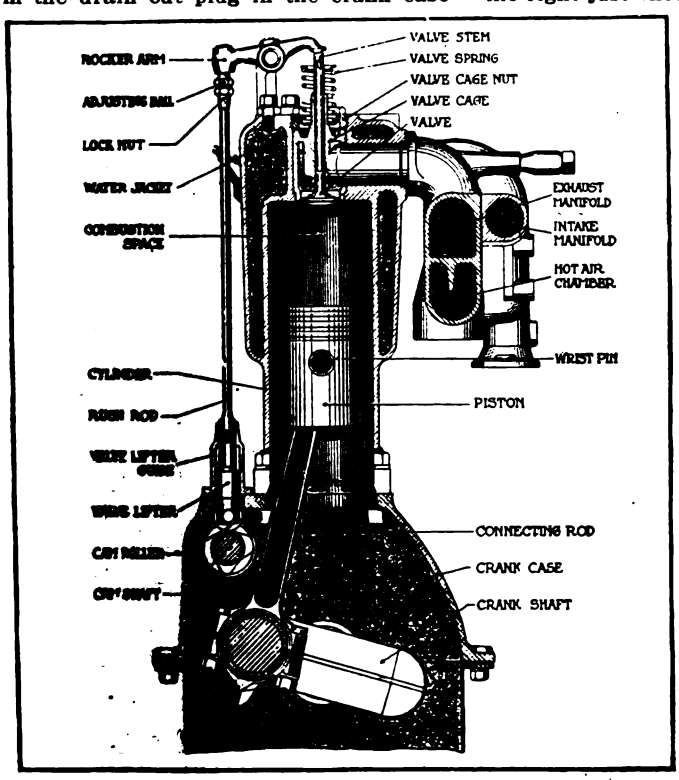
The Vacuum Feed System.

In 1914 and 1915 the cars known as models B and C 24 and 25 the gasoline was fed by gravity. The fuel for models B 36, 37, 54 and 55 were fed by air pressure supplied by a hand pump on the dash when starting, and after the motor was running by a pump operated off the camshaft.

The main cause for trouble here would be leaks in the air line, allowing the pressure on the main tank to drop, so that the carburetor would not get its supply of fuel. In 1915 this system was changed and the vacuum tank system has been used since then. This consists of a tank or cylinder placed at some convenient point near the engine, preferably on its side. With the vacuum system the engine gets the same pressure of feed, either on the level at speed or on the steepest grade.

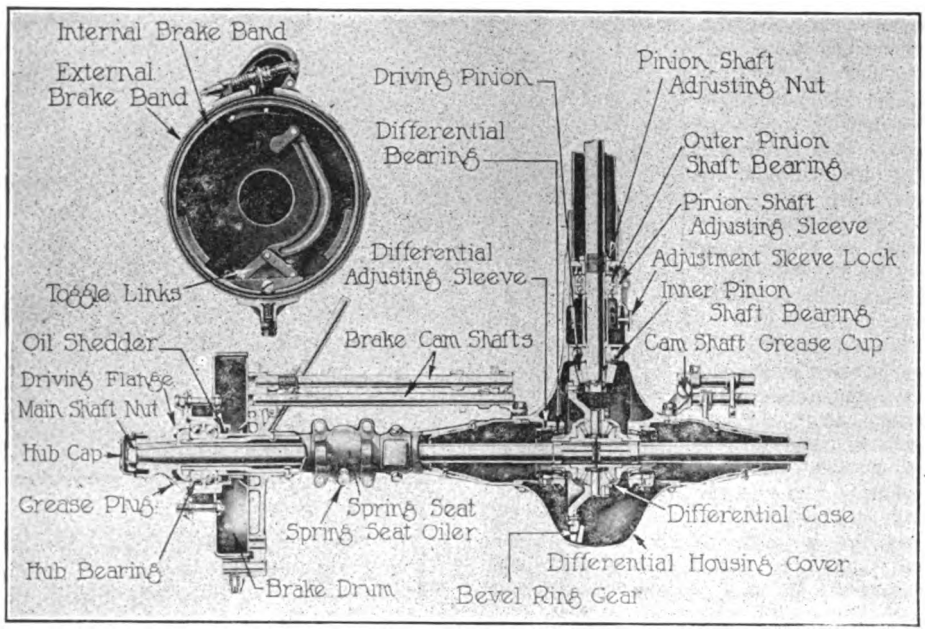
The gasoline is drawn from the main tank at the rear by the suction of the pistons in the cylinder. A small pipe is led from the intake manifold to the top of the vacuum tank. The tank is divided into two sections, the upper containing a float and valve mechanism to control the flow of gasoline. This section is kept partly filled with gasoline. The lower section is the main feed chamber and contains an automatic valve that opens and closes according to the volume of gasoline drawn by the carburetor.

This is a flapper valve that is held in place loosely by two screw bolts. The gasoline enters the upper chamber through a strainer, that catches what ever dust and lint may come through from the main tank. Occasionally this strainer should be taken out and cleaned, for if partially clogged with sediment the engine will not develop its best power. By the float and valve regulating the flow of gasoline the chamber is kept filled to a constant level. This operation is automatic and the system requires no attention unless it fails. The bottom end of



Buick Valve Mechanism.

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Buick Rear System and Axle.

the float carries a stem that rests in the top of the feed tube through which the gasoline passes into the second chamber through the flapper valve located at the bottom of this tube.

Any water in the gasoline may be drained from the bottom of the tank by a drain out plug in the center. The top of the outlet pipe to the carburetor is fully one inch higher than the bottom of the tank and as water will separate from gasoline and remain at the bottom, it can easily be drawn out.

Adjusting the Clutch.

The type of clutch as used in Buicks from 1914 to 1917 is a leather faced cone. Beginning with the 1918 series a disc type, made up of steel plates having the alternate plates covered with asbestos fabric riveted on was used. The cone clutch used in all models to 1918 is practically the same form, so that a description of one will serve for all cars between the years stated.

As a gasoline engine cannot be started under load, it is connected to the driving mechanism by a friction clutch which can be released by pressing down on a clutch pedal. The cone clutch consists of a leather faced member which engages the inside face of the flywheel rim. It is held in place by four springs, the tension of which can be adjusted to take up the wear of the clutch facing by turning nuts on the ends of studs which fasten them to the flywheel. In adjusting the clutch springs be careful to turn all adjusting nuts the same to prevent throwing the clutch out of line.

The probable points of wear to look for in the clutch are the throw out collar on the main shaft and the yoke connected with the clutch pedal that operates it. The leather facing of the clutch, which fits into the inner rim of the flywheel, if worn badly, should be replaced with new. The ball bearings of the clutch can be taken out and examined. They should not be so badly worn as to require replacement if they have been properly lubricated. Three grease cups are on this assembly, one for the inner bearing nearest the hub of the clutch, one for the fluted shaft upon which the propeller shaft slides when the clutch is held out and the third for the rear ball bearing next to the throw out collar.

To secure smooth action a frequent application of neat's foot oil to the clutch leather is necessary. If the clutch shows a tendency to slip, wash the leather with gasoline or increase the tension of the springs.

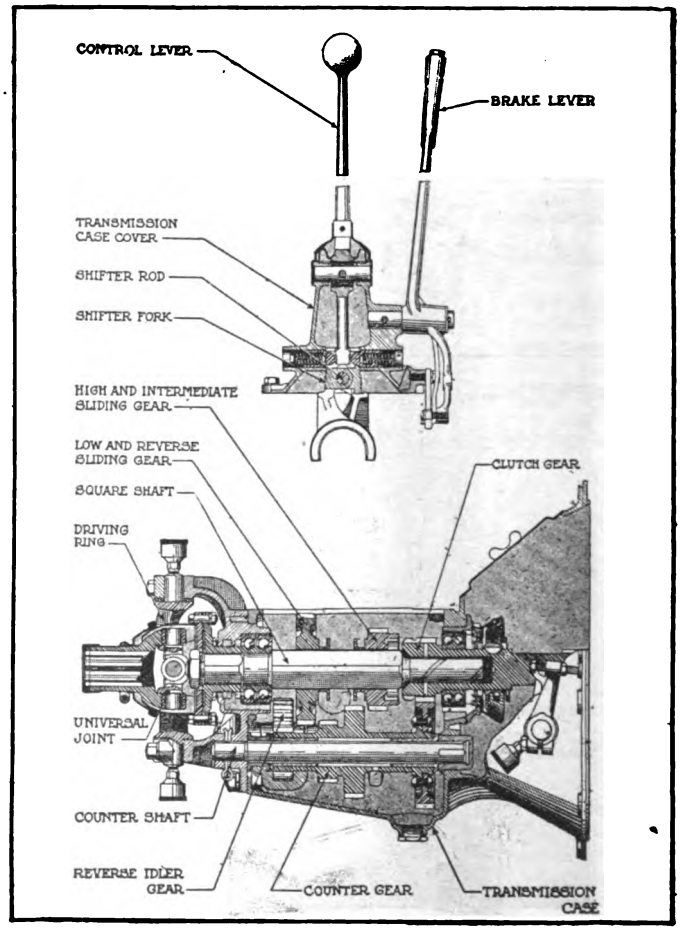
The Buick clutch is equipped with a stop or brake that acts when the clutch pedal is pressed down to the floor. This brake stops the clutch spinning and allows the gears to be shifted quietly. When the lining of the clutch brake has become worn, so the clutch will spin after disengagement and the shifting of the gears is difficult, adjust it by loosening the clamp bolt and turning the adjusting nut to the left, or counterclockwise. This will compress the brake spring and stop the clutch much sooner.

The transmission gearset is the same for all models of Buick cars from 1914 to 1919. It is a selective type having three forward speed ratios and reverse, mounted on ball bearings. With the clutch assembly free from engine case and transmission case, by disconnecting the universal joint at the rear of the transmission case it will be a fairly easy matter to disassemble the gearset. Take off the cover and draw out the oil and grease through the plug at the bottom. Wash the case out with gasoline and a brush to take out any sediment.

With the hand grasp the gear shafts one at a time to see if there is end or side play in the bearings. If excessive play is found new bearings will have to be supplied, as those on the main shaft are non-adjustable. The countershaft is mounted on bushings and these will have to be renewed if worn too much. The main shaft has a squared end and a nut on the universal end which fits a squared socket in the hub of the universal joint. Remove this nut and the hub of the universal can be removed.

To further dismantle the case for the removal of the bearings the rear end of the case will have to be unbolted. This will mean the removal of several nuts on the rear end. The rear end of the countershaft is held by a cotter pin. This will have to be taken out before the casing can be entirely removed. The bearing on the main shaft will now be slipped out.

The main shaft with the gears can also be taken out of the case, either through the rear or through the top. The countershaft can be removed, leaving the gears in the case to be taken out through the top. Examine the gears for wear of the teeth. If they are badly worn replace them with new gears. If they are only burred on the ends they may be ground off with an emery grinder.



Transmission.

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The countershaft runs on a pair of bushings, one at each end, and the countershaft and gears, with the exception of the countershaft driven gear, which is riveted in place, is a unit. To replace any one gear all but the countershaft driven gear will have to be renewed.

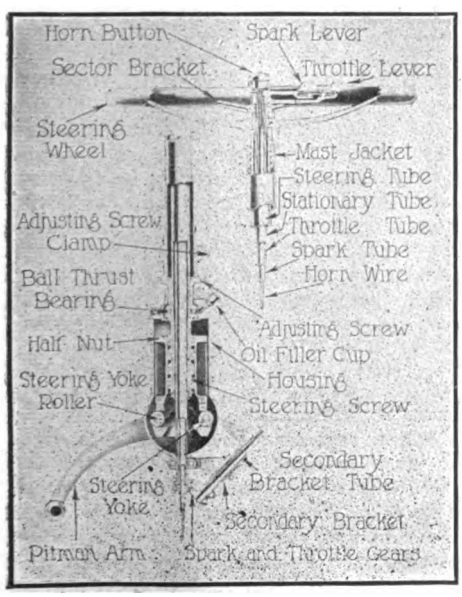
In assembling the transmission gearset be sure that all nuts and bolts are tight and cotter pins are put where needed. All nuts and bolts that are lock wired should be rewired.

In filling the transmission with oil, a heavy lubricant should be used. A steam cylinder oil is very good, or a medium grease, having more or less stringy consistency will serve. The reason is that if grease only is used the gears cut a path in it and do not get sufficient lubrication, especially the gears on the main shaft. When heavy oil is used the oil remains on the teeth of the countershaft gears and is carried up and through the teeth of the main shaft gears when they are in mesh. Fill the case to within an inch of the main shaft. On some Buick cars plugs are located on the sides of the cases to indicate the proper oil level.

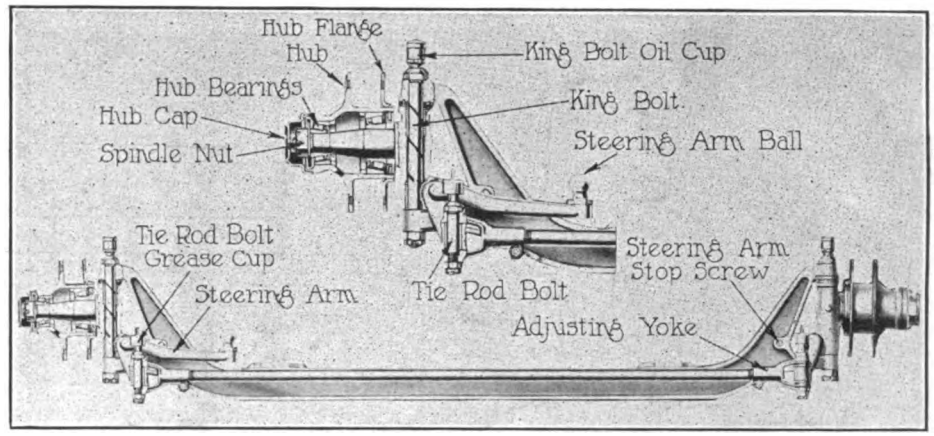
Inspecting the Universal Joint.

The universal joint will wear and should be examined. If worn badly replace the worn parts. Fill it with steam cylinder oil through the pipe plug of the joint. This can be found by rocking the car back and forth till this plug comes opposite the offset in the driving ring. Remove the plug and inject the oil with a grease gun. Put the plug back securely. The universal joint should be lubricated every 500 miles.

The universal joint compensates for varying angularity of the driving shaft and is between the transmission gearset, which is fastened rigid to the frame, and the rear wheels. The rear axle is attached to springs and must follow the surfaces of the road. The driving shaft is enclosed in a torque tube, the yoke at the forward end of the tube being mounted on the arms of a "gimbal," which affords universal action. The forward end of the shaft is adjustable for end play. To make this adjustment loosen the clamping screw at the end of the torque tube and turn the nut until the shaft is not movable longitudinally.



Steering Gear.



Front Axle.

Restoring the Rear Axle.

The rear axles of models B and C 24 and 25 of 1914 and 1915 are semi-floating types. These must be taken from the car entirely and to remove them the torque rods are unbolted from the differential housings, the tie rods disconnected, the wheels taken off, the differential unbolted and the housing separated. The differential housings must be unbolted and the case disassembled to remove the axle shafts. After this has been done the rings or nuts that secure the shafts can be removed and the shafts driven through the hubs of the differential bevel gears. Drive the gears off the shafts and examine the shafts for wear, the bearings should be looked over as well as the differential gears. All worn parts should be replaced.

In models B and C and 36 and 37 of 1914 and 1915 the three-quarter floating type of axle was used. In this type the shafts are secured in the differential bevel gear in the same manner. The chief difference is that the wheel bearings are placed on the axle housing in the three-quarter floating type while it is placed inside the housing in the semi-floating.

In models B and C 54 and 55 of 1914 and 1915 the axle is a full floating type, and this axle is used in all six-cylinder cars built after 1916. Models D 34 and 35 were 1917 and 1918 four-cylinder cars. These also have axles of the three-quarter floating type. The shafts of these axles are secured in the differential gears by castellated nuts and cotter pins, instead of split rings as in earlier models.

The full floating type shafts can be removed by loosening the nuts on the outside of the hub. The hubs and shafts may be removed without jacking the car. The end bearing is outside the axle housing and directly under the hub of the wheel, the wheel being secured in the axle housing by a nut and a locking washer, one edge of which is bent over against the side of the nut.

Condition of the Differential.

The differential gearset can be removed for inspection by taking off the large plate at the back of housing. Loosen the bolts that hold the cap in place over the bearing and the gearset can be removed as a unit to the work bench for dissembling. The main shaft and torque tube can be removed from in front of the differential by loosening the nuts that secure the assembly to the housing and slipping it out for dissembling at the bench.

Examine the gears for wear and the bearings for wear and play. Replace all worn parts. Hyatt roller bearings were used in the earlier small car axles and ball and roller bearings in the later models.

In assembling the differential gearset and rear axle be sure that all parts are in exact relation, all nuts and bolts securely tightened and lock nuts rewired. There are adjusting sleeves, one on each side of the differential gearset case, and to make adjustment turn these sleeves to force the master gear either closer into mesh or further away from mesh with the driving pinion.

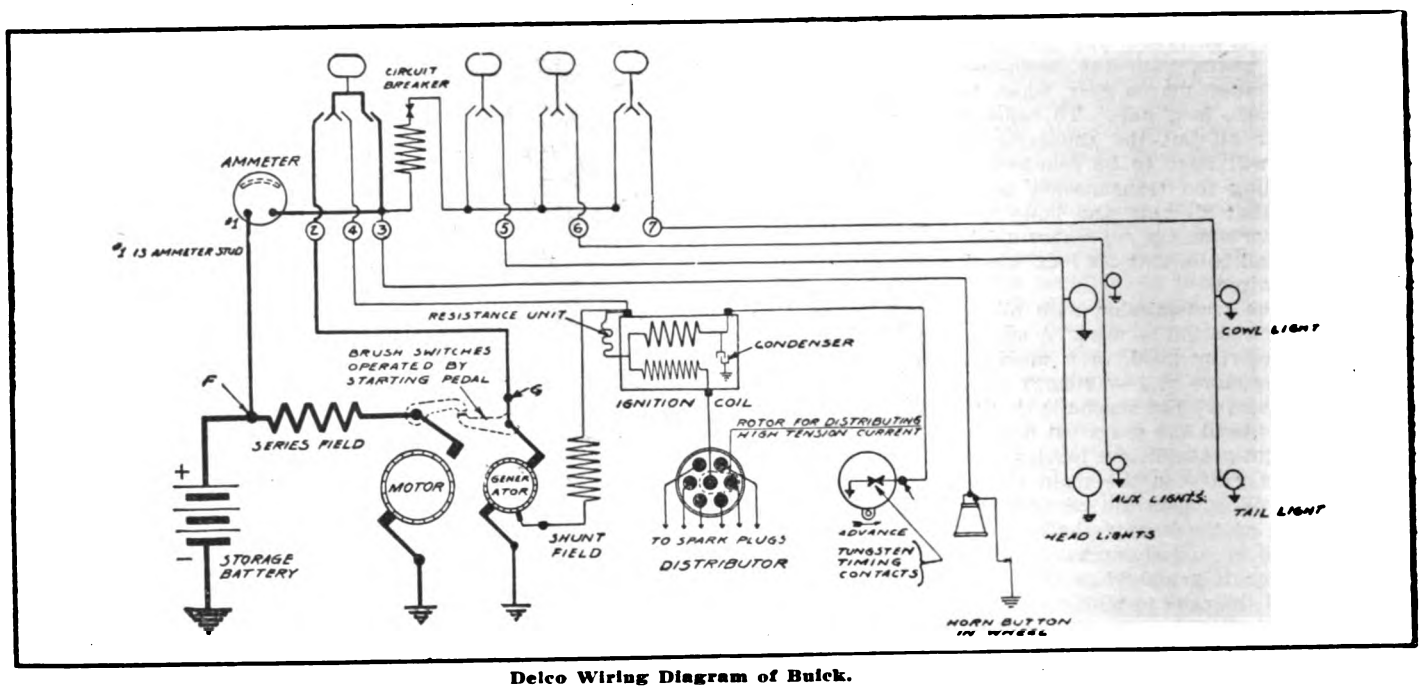
The adjusting sleeves should be so set that the pinion and the gear will have contact the entire width of the gear teeth. When properly adjusted the master gear will have no side play, may be easily turned and spun without noise. Replace the differential in the housing and replace and bolt the radius rods. The semi-floating type axle is assembled complete with the wheels in place and then pushed under the car. Lower the car, connect the springs, brake rods, etc.

In the full floating type, after the differential has been put in place, the axles may be slipped into place and the hub caps bolted to the wheels. Steam cylinder oil should be put into the differential housing to the height of the filler plug.

While overhauling the rear axle examine the brakes. If the facings are badly worn reface them with a good brake facing. They should be adjusted to have a clearance of 1/16 inch between the lining and the circumference of the drum when the brakes are released. The throw of the brake levers and the position of the pedal can be adjusted by the turnbuckles in the brake rods. The brakes on both wheels are to be adjusted alike.

Examine the spring bolts and the shackles for wear. If worn badly replace them. Tighten all loose nuts and bolts on the chassis frame at this time. See that all grease cups are filled with grease and turn them down several times before filling them finally.

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Delco Wiring Diagram of Buick.

Front Axle and Steering Gear.

The front axle will need some attention. One should look for end play in the wheel bearings. These are Timken roller type and may be taken up at the end by the nut and possibly adding thin washers. Fill the hub cap with grease and screw it on to the end of the hub. The grease will be forced through the bearings and will thoroughly lubricate them. Test the wheels for alignment. There are several different ways of doing this, but probably the simplest is by turning the front wheels until they are ap parently in line with the rear wheels. Wind the end of a string to which a weight is attached around the tire and rim of a rear wheel above the hub, draw the string taut from the rear wheel to a like position on a front wheel just over the top of the hub cap, carrying the string to the forward edge of the tire. Turn the front wheels till the opposite sides of the front and rear tire just touch the string. Make the same test on the other side of the car. The misalignment in or out will be shown by the string bearing against the front wheel at its rear side. Adjust the tie rod to correct this. The rear wheels of all cars are practically straight up and down while the front wheels because it is necessary in steering should toe in somewhat at the bottom.

The steering gear should be examined for wear, and can be adjusted by the clamp and adjusting ring at the top of the worm. Turning the adjusting ring to the right tightens the worm against the two split nuts that operate in connection with the worm. and turning it to the left loosens the adjustment. A grease cup on the top of the worm should be kept filled and turned down every few days. On some cars there is a plug instead of a grease cup and if there is a plug remove it and fill with steam cylinder oil.

Three or four times a year all oil should be drained from the base of the engine, transmission case and rear axle, and these parts washed thoroughly with gasoline or kerosene and refilled with fresh oil. Use just the right quantity of oil or it will run out of the bearings and waste.

Lighting and Starting System.

The Delco lighting and starting system has been used exclusively on Buick cars since 1914, on early small cars the Delco Junior system of 1914 and the year following, but on the larger cars of these years a somewhat larger unit of the same general type was installed. This later type has been continued with the improvements made each year.

The timing contacts should be so adjusted that when the fiber block on the contact arm is on the highest part of the breaker cam the contacts are apart the thickness of the gauge on the distributor wrench marked "distributor," or on some of the older wrenches the gauge is marked "for steel cam distributor." This is 18/1000 inch thickness. The thickness of a worn dime is accepted by some repair men who lack a wrench. The setting for the spark plugs is 18/1000 inch. A slightly wider adjustment is usually permissible.

The storage battery will need some attention, especially if the car has been laid up all winter. Test the battery with a hydrometer by removing the rubber stoppers in the top of the cells. Draw out a portion of the electrolyte into the body of the instrument. The condition of the battery will be shown by the reading on the float inside the hydrometer.

This reading denotes the specific gravity of the cell and can be read as follows: A specific gravity of 1.275 to 1.300 indicates a fully charged battery in good condition. A specific gravity of 1.200 to 1.250 indicates a half charged battery. A specific gravity of 1.150 indicates a completely exhausted battery that should have immediate attention. When testing a battery with a hydrometer remove the filler plug from only one cell at a time and be sure to put the electrolyte back in the same cell from which it was taken.

MARLIN-ROCKWELL CORPORATION VOTES ANOTHER DIVIDEND.

The Marlin-Rockwell Corporation has declared another dividend of $1 a share on its common stock.

This company, organized in 1915 under the name of Marlin Arms Co., bought the stock of the Marlin Fire Arms Co. and subsequently bought the Standard Roller Bearing Co. of Philadelphia, and the Hopkins & Allen arms plant, in Norwich. It was able within two years to retire $3,500,000 of preferred stock out of its earnings and leave a substantial balance for common.

The company profited handsomely from a contract for the manufacture of Browning guns for the Russian government, notwithstanding that a royalty had to be paid the Colt's Patent Fire Arms Co. of Hartford, which owned the exclusive right to manufacture. Soon after the armistice the Marlin company changed from manufacturing munitions to production of automobile accessories, such as radiators, wire wheels and roller bearings.

SUGGESTED HORSEPOWER RATING.

In the absence of any reliable horsepower rating for motorcycle engines, and having instanced the unsuitability of existing formulas in determining the horsepower of motorcycle engines, the Motorcycle recommends that 100 cubic centimeters be regarded as one horsepower. Thus the popular 350 cubic centimeters and 500 cubic centimeter bicycles would be rated at 3½ and five horsepower respectively. This simple rating can also be successfully applied to small cars.

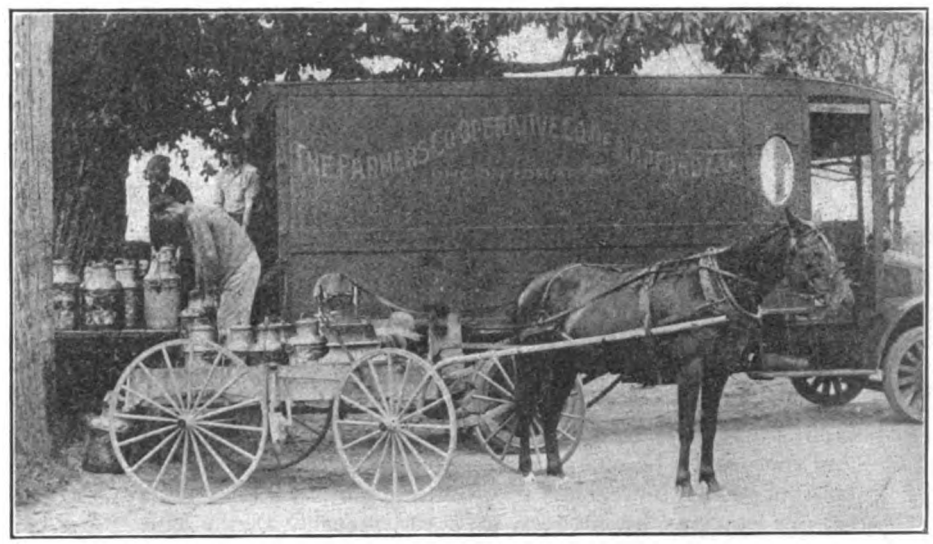
When replacing chains on your tires be sure to have the hooks toward the back as you lay them over the wheel. This gives a wiping motion to the hooks when in use, which tends to keep them closed. If the chains are put on the other way they will tend to open and be in danger of coming off.

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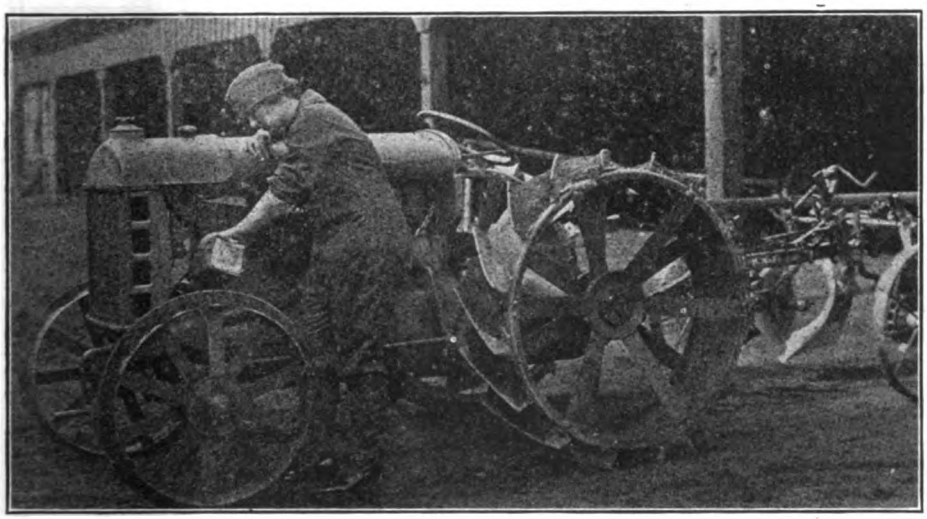
PICTORIAL NEWS OF AUTOMOTIVE INDUSTRY



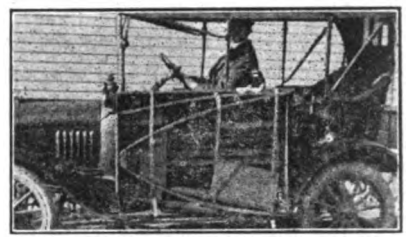
The New HB Bench Grinder, Made by Hobart Brothers Co., Troy, O., Has a Ball Bearing Motor of Ample Capacity and Is a Useful and Practical Device for the Garage or Machine Shop.



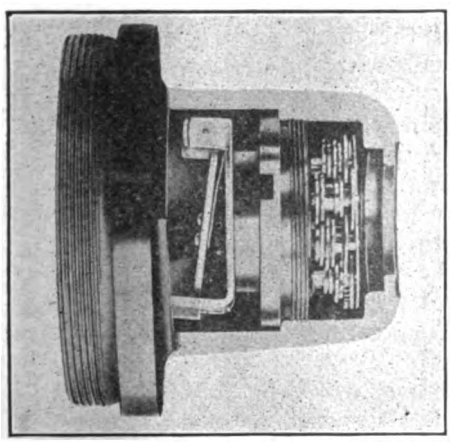
The Farmers of Harford County, Maryland, Operate a Motor Truck Route for Themselves with Entire Success. This Is One of Their Roadside Loading Platforms, to Which the Farmer Brings His Milk by a Short Haul, and the Truck Takes It to Baltimore.



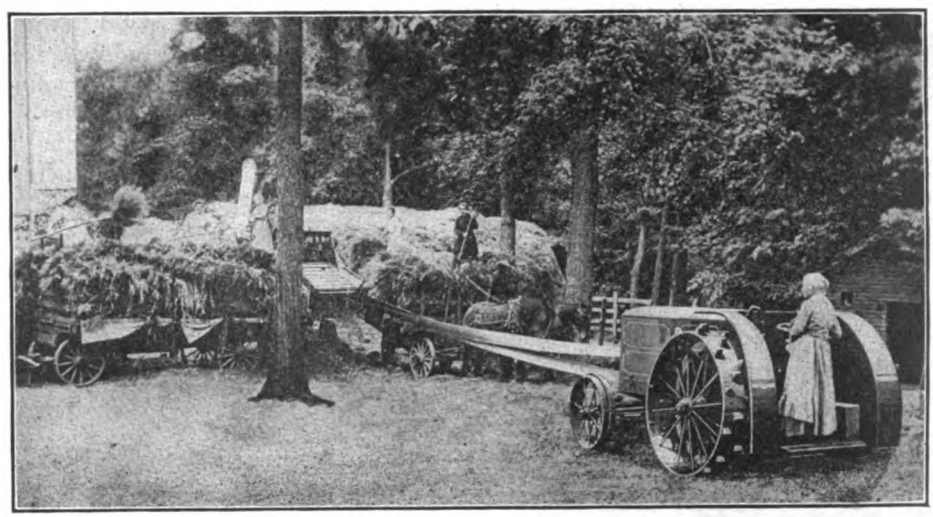
A Fordson Tractor and an Oliver Plow That Was Driven with Excellent Efficiency by a Woman, Who Is Shown Filling the Oil Reservoir.



This Is the "Carryit Withu Boat," Made by the Battle Creek Boat Co., Battle Creek, Mich. It Can Be Assembled in Five Minutes. Many Autoists Will Want Such a Boat As This.



Cutaway Section of New Dreadnaught Hub Odometer to Show Recording Mechanism Drive. Made by American Taximeter Co., New York City.



A Lauson Full Jewel Tractor Running a Case 36-Inch Grain Separator, Being Operated Entirely by Women.

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PLATE XXXVI

SERVICE STATION WITH MODERN FACILITIES

One-Story Structure Which Would Accommodate Both Passenger Cars and Motor Trucks—Ample Provision Has Been Made for Storage Purposes.

IN PRESENTING the accompanying lay out an endeavor is made to illustrate how closely connected are the garage (or storage compartment) and the service division. The service station must be so established that it will have every facility essential to serving customers efficiently and there must be means for economical administration. Ever increasing progress demands that service stations be modern in every respect, as well as being ample in size for storage purposes, so that owners of cars may have their repairs done in the shortest time possible and afforded expert attention and high grade workmanship and supplied the best qualities of material. Therefore, it is absolutely necessary that a place be fully equipped to meet these demands if the term "service" is to be used. A judicious expenditure of money will usually provide many splendid facilities that will make the service station much more valuable to the management.

Building Dimensions.

The size of the building shown here is 80 by 180 feet, designed to face on a main street. The elevation has been treated to a degree where it would add greatly to the general appearance of any locality. It is of the one-story type, the entire structure being devoted to automobile vehicles and their accessories.

In the center is found an office for the transaction of general business, with doors leading to the garage department and show room; also an entrance door from the street. Adjoining the office is the show room, which is large enough in size to hold two or three cars and permit the installation of cases for the display of accessories.

Repair Department.

Directly to the rear will be found the general repair department, with large work benches and a pit for working underneath large cars; also a tool closet in one corner. Close to the repair shop is entrance into the machine shop, the heart of a service station. This department should be equipped to handle everything that is to be expected of an automobile repair shop. On either side of the forging department are storage areas, one for pleasure cars, the other for motor trucks. The motor truck storage will be found on the right, while opposite on the left and covering an equal area, is located the passenger car space.

The few columns that have been used are so spaced as to allow the greatest ease possible during inside manouvering for a position in line. A boiler room is reached by a flight of stairs just outside of the machine shop, as the location of the boiler would be underneath the machine shop and toilet. A toilet and a wash room have been provided, suitable to the needs of a shop of this size.

General Construction.

General construction would be of the slow burning mill type, which has been found extremely satisfactory for buildings such as this, where there is always a great fire hazard. The foundation would be of concrete, sufficient in size and depth to carry all loads placed upon it. Provision can be made at the beginning for future expansion, and, at a very small cost over the original figure, a foundation can be laid for two or three stories, if so desired.

Brick constitutes the super-structure, with terra cotta for trim. Owing to the numerous kinds of bricks and the nearness of them to different localities, no particular make is suggested here, but we do recommend that a brick of a hard nature be used, as the harder the brick the less absorption of water, therefore eliminating excess dampness due to use of a poor product.

Other Details.

Terra cotta may be of a glazed or dull finish, or concrete stone may be used for trimming instead. Granolithic floors are provided, drained as shown, and laid on a bed of five inches under concrete, the finished floor being one inch of a mixture of 1-1.

Windows are of the metal sash type with wired glass, complying with the fire laws of different districts.

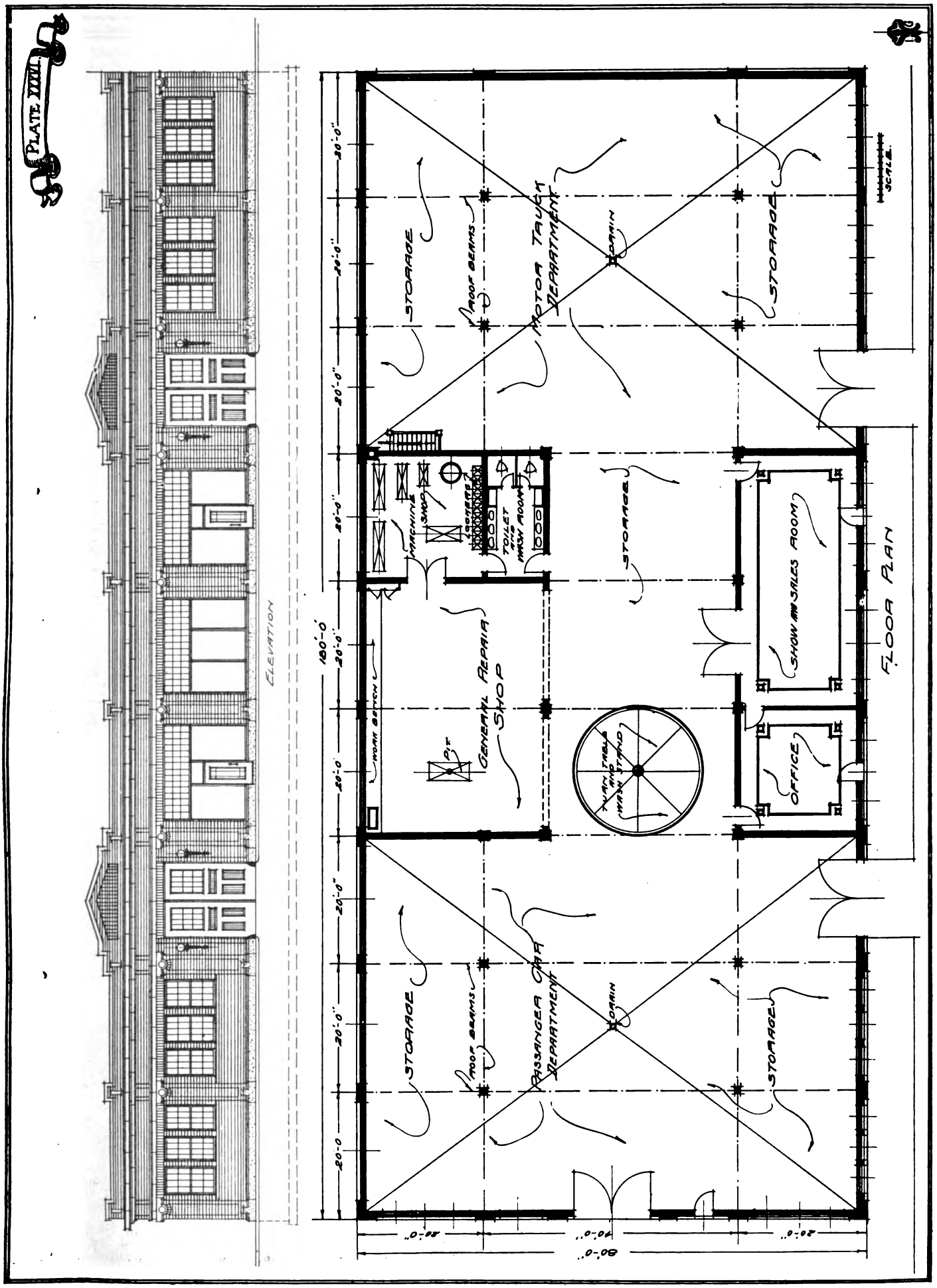
The roof is of plank supported by steel girders and wood purlins. A five-ply tar and gravel roof is advised, this having been found to give excellent results in many instances.

The drainage of the roof should be given careful consideration, the roof sloping at least one-half inch to the foot. Lead flashing should be used throughout. For heating, steam wall radiation is advised.

The approximate cost would be $20,000.

For any further details regarding such a structure, write to the Architectural Department of this publication.

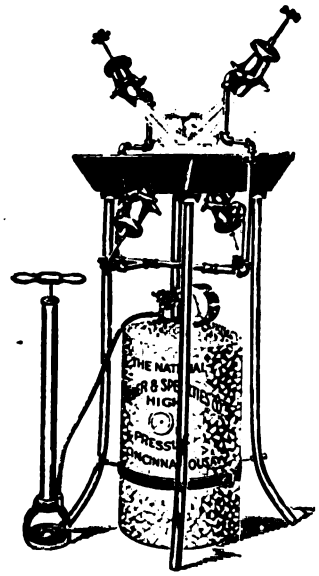
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ACCESSORIES DEPARTMENT

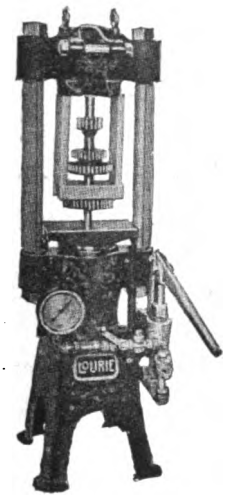
Brazing Forge. Many jobs are brought to repair shops that are too small for economical working if the shop is equipped only with a blacksmith's forge, that may readily be handled by this brazing forge described. Shops not equipped with forges can utilize a brazing forge for all small repairs that require welding. The National Rubber Co.'s Brazier No. 2 may be used anywhere in the shop, burns gasoline for fuel (74 test gasoline, if possible to obtain it), but will do satisfactory work with other grades of gasoline the maker claims. By following the simple instructions sent with the brazing outfit any repairer should be able to do good work after a little practise. The brazier



is self-contained, occupies little space, may be placed anywhere handy to the work and is complete as follows: Pressure tank and gauge with the necessary fittings and connections, burners, valves, etc., air pump and stand. When in operation the tank carries a pressure for long jobs of 40 to 50 pounds and 30 pounds for small jobs. By using the special brazing compounds other metals beside iron and bronze may be welded.

Manufactured by the National Rubber and Specialties Co., 4433-4439 Chickering Ave., Winton Place, Cincinnati, O. Prices and literature on application.

Lourie Hand Hydraulic Arbor Press. The Lourie Hand Hydraulic Arbor Press is of smaller capacity than the power sizes made by this company and is manufactured for the garage and repair shop trade that desires a hand tool for forcing gears and pulleys from shafts or forcing them into place on shafts or for broaching keyways in gears. The machines do the work quickly without battering the ends of shafts or breaking gears. They can be used for testing the strength of materials, broaching any kind of a hole, pressing bushings and pins to place, re-



moving ball races from auto and truck shafts, straightening shafts or bars and other similar uses. In operation the motion is reversed from the ordinary screw machines for this purpose, being up instead of down, as in screw or rack type. Each press has a base cylinder ram pump, with valves, cross head, strain bars and springs to return the ram quickly to the cylinder. The extras include gauge V blocks for spacing, swinging arms for V blocks and additional pump. The capacities are 20, 30, 40, 50 and 60 tons.

To operate press, fill the tank with any light running oil, close the valve and pump oil into the cylinder, which operation raises the ram very powerfully. To release the pressure, open the valve and the springs will cause the ram to return within the cylinder very rapidly.

Manufactured by the Lourie Mfg. Co., Springfield, Ill. Prices on application.

Wagner Auto Cleaner. The Wagner Auto Cleaner is a handy tool for motorists, as with it the car owner can keep the engine free from dirt and oil with slight labor. It is easily attached to an air hose either from a storage tank or from a spare tire. The second hose marked kerosene is placed in a pail of kerosene. Turning on the air pressure draws the kerosene from the pail, forcing it out of the nozzle at a strong pressure, and by



directing the nozzle against the side of the engine the oil and dirt will be quickly removed. Six pounds of air pressure is required and one quart of kerosene will clean any size engine the manufacturer claims. As a constant flow is required for the successful operation of the cleaner a foot pump is not recommended.

Manufactured by Wagner Specialty Co., 1902 Broadway, New York City. Sold by Asch & Co., 16-24 W. 61st St., New York City. Price, $2.

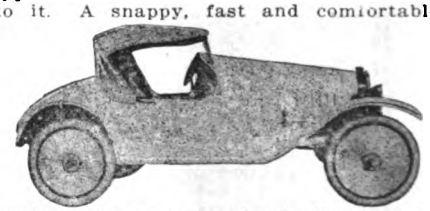
Spee-Dee Cleanser. The claims of the manufacturer for the efficiency of Spee-Dee Cleanser are based on two qualities that should commend it to automobilists. The one of these is that it may be used either with or without water, and the other is that it will serve equally well for cleansing the machine or the person. The compound is sold in cans that can be carried in the car and in which it may be protected from dust accumulations. It is butter like and creamy, contains no abrasive and it is especially efficacious, for it can be used on highly finished surfaces without damage, and it will remove oil,



grease or dirt in any form from the car or from the body. As no water is necessary to effectually clean one's hands it is very useful for car owners. Rubbing a small piece of the compound into the hands and wiping them with a dry cloth is said to be as effective as water.

Manufactured by the States Chemical Co., Chicago, Ill. Price, 25 cents a can.

Paco Special Ford Racing Bodies. Paco bodies for Ford cars have a distinctive design that will appeal to those who desire a body that is radically different from the regular Ford equipment and are inclined to the sport or racy type. A Ford car with solid wheels and a body of this type will have class and distinction added to it. A snappy, fast and comfortable



roadster can be made of your Ford car by putting on a Paco body. Modeled after the greatest speed cars, with long sloping hood, streamline cowl, low seats and a receding rear end, Paco bodies offer the least wind resistance. They are designed on scientific engineering lines for speed and comfort.

The 1919 Paco bodies include a new sport top and windshield, Paco exhaust, disc wheels and other features.

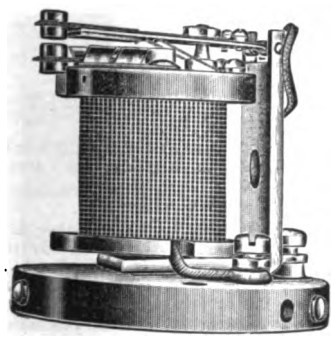
Manufactured by Paco Manufacturing Co., Peoria, Ill.

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Unilite Lighting Outfit. The Unilite tail light outfit for Ford cars will appeal to Ford owners who wish to wire in a rear light. The manufacturer claims that with this outfit the current can be taken from the magneto when the engine is operating and from a set of dry cells when the car is parked. By means of a Unilite con-

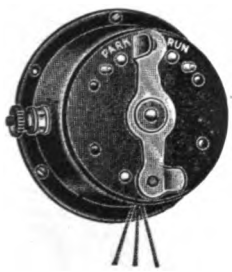


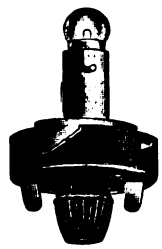
troller and switch and a reverse current cutout this is accomplished automatically when the engine is stopped and reversed when the engine is again started. It is made especially for Ford cars not equipped with a storage battery. The regular outfit consists of one Unilite adapter, with bulb, one Unilite controller and



switch and the necessary wire to make the change, with instructions for installing.

The reverse current cutout No. 2, that automatically connects and disconnects the battery and generator is suitable for automobiles, battery and farm lighting outfits. A combination lighting and bat-





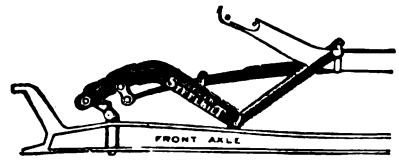
tery ignition switch is also manufactured by this concern, this is of the push key type.

The Unilite outfit sells for $4 complete, the reverse current outfit No. 2, $4.25 to $6, according to the voltage and amperage required, from six-volt 15 amperes to six-volt 20 ampere. Combination lighting and battery switch, $1.35.

Manufactured by the Briggs & Stratton Co., Milwaukee, Wis.

Badger Automobile and Truck Jacks. Badger jacks are made in capacities from ¾ ton and one-ton capacity. Walker screw jacks have lift capacity of from ¾ ton to six tons, and a steel jack of small size is made for small cars. A series of hub jacks is also manufactured. These are sometimes called tire savers and are used by owners to raise the tires from the floor when the cars are stored for any length of time.

The bases of these jacks are large, are



standard ribbed and the steel working parts are made extra strong to withstand the heaviest kind of work. The lift is exceptionally easy. A short stroke of the handle gives a rapid rise and the reverse is positive in action.

Walker screw jacks are of the same heavy construction, but are operated by screws instead of racks and pawls of the Badger jacks. The manufacturer claims

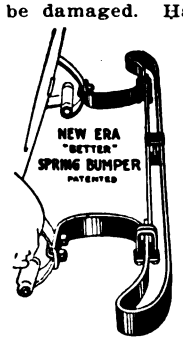


that these jacks are of unusual strength and that they will lift any weight within their capacities.

Other accessories manufactured by this firm include Auxiliary Radius Rods for Ford cars, Walker Steelbilt Shock Absorbers for Fords, Walker Steer-ezer for Fords, Truss Rods for the rear axles of Fords, running board supports and the Walker Foot Accelerator for Fords.

Manufactured and sold by the Walker Manufacturing Co., Racine, Wis. Catalogue and prices on application.

New Era Front and Rear Spring Bumper. The New Era "Better" Spring Bumper is new in the market and is applicable to 95 per cent. of the cars sold. Because of its construction, being made from flat steel bars held together by clamps at the end and a plate in the center, coming into collision will not damage it, manufacturer claims, and because of its resiliency the car will not be damaged. Hangers may



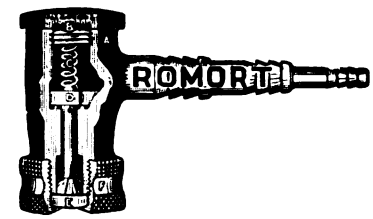
be obtained for attaching the bumper to the various makes of cars so that no cutting or drilling is necessary, whether or not the car is equipped with a mud pan. It can be attached to the front spring hams of the frame in a few moments with a wrench.

For attaching the bumpers to rear springs of cars special fittings are required because of the many types of springs used. These may be purchased with the bumper by specifying the make of car to which it is to be attached.

Ford, front or rear, black, $9; nickel, $11; other makes of cars, standard black, $10; nickel, $12; made to order, $13-$15.

Manufactured by the New Era Spring and Specialty Co., Grand Rapids, Mich.

Romort, Style "A" Tire Valve Connection. The Romort style "A" connection is an improvement over the usual valve connection in use. It consists of a bronze casting, A, with a screw cap top and bottom. The inside valve mechanism consists of a suitable plunger and spring tension. D is a diaphram that closes the



air passage, shutting off the flow of air from the tank when the valve is disconnected from the tire. E, is the base of the plunger closing the opening in the rubber, still further shutting off the flow of air, as it seats on the rubber washer in the valve housing. F is a knurled nut that allows the replacing of new washers. B is an adjusting nut at the top of the housing, allowing the tension of the spring on the valve to be increased.

It is very necessary that air should be governed, for although it is given free to customers there is a certain element of cost in connection with it, more especially in the operation of the motor and pump, and a good automatic valve properly constructed will do more to keep this cost within reason than any other thing. The manufacturer claims that the Romort automatic valve will result in a very substantial economy.

Manufactured by the Zinke Co., 1323 Michigan Ave., Chicago, Ill. Price regular stem, $3.

Tire-Doh. The Tire-Doh outfit consists of a can of Tire-Doh cement and a can of Tire-Doh, a putty-like substance. To make a tire repair the rubber surface is first cleaned and Tire-Doh cement is applied and allowed to dry for a few moments. The Tire-Doh is then spread over the puncture or tear. When applied according to instructions, Tire-Doh readily drys and becomes a tough integral part of the repaired surface. Two cents' worth of Tire-Doh will repair the average tire tube puncture. Any punctured tube can be repaired with Tire-Doh the manufacturer claims.



Torn out valve stems can be mended with Tire-Doh, as it can be kneaded into the rupture so as to obtain strength that would hardly be obtained with a vulcanizer. Tire-Doh is self-curing, a vulcanizer not being necessary.

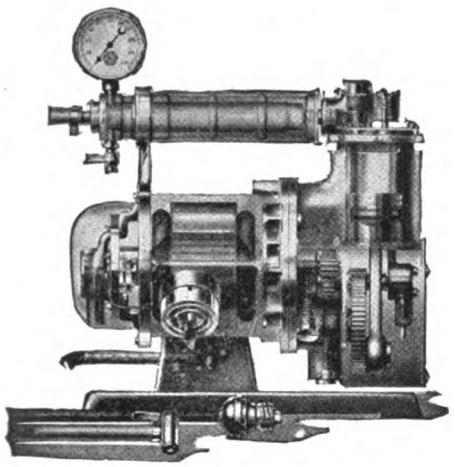
Tire-Doh may also be used satisfactorily for repairing casing cuts. By filling these as found the motorist can lengthen his tire mileage considerably, for keeping water and dust from entering the casing will prevent a great deal of deterioration.

Manufactured by the Atlas Auto Supply Co., Chicago, Ill. Prices, large size outfit, $1; Junior outfit, 50c.

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The Lectroflator. The Lectroflater is an air compressor and motor combined on the same base, the motor being direct connected to the compressor.

In construction it is in a separate class from others, having forced draft for cooling the motor and compressor. The air is drawn in through a screen at the commutator side of the motor, passing over the armature and through the air chamber surrounding the cylinder of the compressor, keeping the motor winding and the compressor cylinder oil cool at all times. Lubrication is by an automatic wick feed to all bearings, using grease instead of oil, which always insures a sufficient supply of lubricant and at the same time prevents flooding the cylinders with oil or injecting oily vapor into the air.

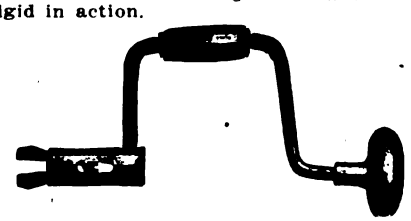


The motor is especially designed, operating from any electric lamp socket, on either direct or alternating current. It is so designed that it will start the compressor against 150 pounds pressure without the use of either hand or automatic unloading device, and will operate the compressor continuously against this pressure, the makers claim. The outfit is complete with large, accurate pressure gauge, electric switch, attachment plug and tire connector, long serviceable rubber hose and heavy duplex electric cord.

Manufactured by the Black & Decker Manufacturing Co., Baltimore, Md. Prices on application.

Utility Wrench. The Utility Universal Rim Wrench is a single tool that the manufacturers claim will fit the nuts of all demountable rims. Is built in one size only. It should be carried in the kit of every motorist and should be in the tool box of every repairer. It is a size that is not cumbersome and when needed will fit, hold and turn any nut.

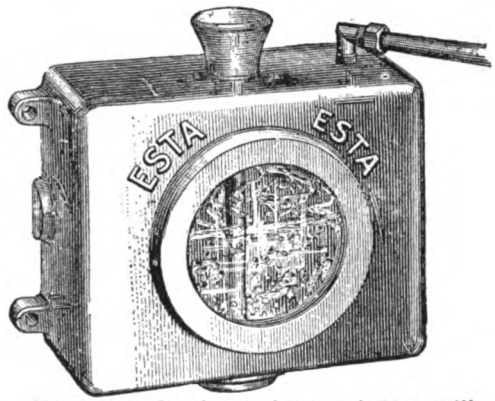
The new Utility Wrench is finished in nickel and black enamel. The jaws are practically unbreakable. It will fit the tool box without folding and is absolutely rigid in action.



For a slight additional cost a Universal Utility Wrench set may be obtained with the Utility Wrench that will take the place of a socket wrench set and may be used with the wrench in the same manner as the socket wrench.

Manufactured by the Hill Pump Valve Co., Chicago, Ill. Price of the Utility Universal Rim Wrench, $1.75. Including the extra set of socket fittings, $4.50.

Esta Water Auxilator. It is a well known fact that water admitted to the combustion chamber of an automobile engine in small quantities will have a tendency to make the engine run better, will to certain extent eliminate carbon and increase the mileage of the fuel.



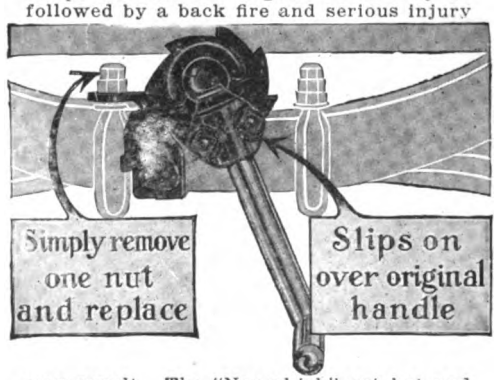
The Esta Water Auxilator is a device of this kind that employs a somewhat different principle from the other humidifiers in use, from the fact that instead of admitting the water either directly to the cylinders or in the form of steam, the air supplied to the carburetor is passed through a body of water. The air in passing through the water absorbs more or less moisture. This moist air is carried into the intake manifold of the engine, and on into the combustion chamber of the engine by the rush of gas and air from the carburetor.

The maker claims, after very exhaustive tests, that this device will remove carbon from the engine in a short time, will increase the pulling power of the engine and the gasoline mileage of the car.

The device consists of a handsome cast aluminum water tank that is fastened to the front of the dash and connected to the manifold by a short piece of brass or copper tubing.

Manufactured by the Esta Co., 107 Massachusetts Ave., Boston, Mass. Prices on application.

"Neverkick." The "Neverkick" consists of a ratchet and pawl that may be quickly attached to the bottom of a radiator around the starting crankshaft, and is guaranteed by the manufacturers to prevent a broken arm if by chance the engine should back fire. The operator may neglect to retard the spark lever and attempt to start the engine. This may be followed by a back fire and serious injury



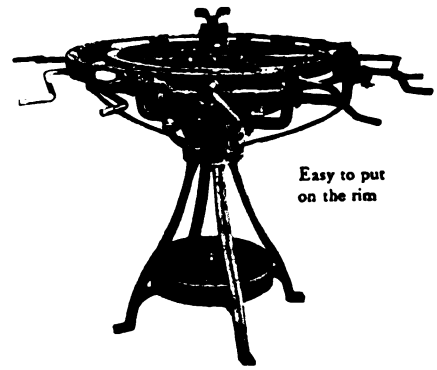
may result. The "Neverkick" ratchet and pawl is manufactured and sold to obviate this condition. It has the recommendation of accident insurance companies and its use will insure against an accident of this nature. May be applied in 10 minutes, as there are no holes to drill, and after once in place will last many years.

Manufactured by the Banner Accessory Manufacturing Co., 2629 La Salle St., St. Louis, Mo. Price, $3.75.

Universal Wheel Compressor. The Universal Wheel Compressor is a tool for the repair shop for use in the rebuilding of wheels or the cutting down of motor truck wheels for the purpose of putting on pneumatic cord truck tires. It is built unusually strong throughout of the best of materials, and the manufacturer claims that by its use many wheels that formerly went to the junk pile may be repaired to the satisfaction of the owners.

The primary object of the compressor is to provide a mechanism which is adjustable for all types of auto and truck wheels, and it is so constructed that repair work may be done speedily and with ease. The wheel can be accurately set to give it the desired dish and each spoke can be pressed individually, the rim being pressed on in a few minutes without the use of ordinary clamps.

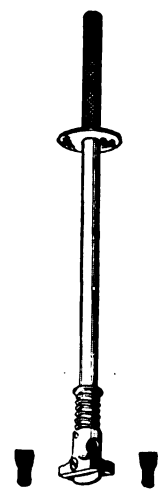
The machine is so constructed that the compressing ring may be turned like a turntable, no power being needed. Wheels of any size can be repaired. Wire and wooden wheels may be trued and new spokes put in. The machine is strong



enough to handle the heavy truck wheels as well as the smaller wheels.

Manufactured by Universal Wheel Compressor Co., Cedar Rapids, Ia. Prices on application.

Hudson Universal Jointed Valve Grinder. The Hudson Universal Valve Grinder is fitted with a universal joint that allows the working end a certain amount of motion in any direction relative to the shank. When the shank is being revolved between the palms of the hands the entire valve area is ground accurately, the manufacturer claims. The valve grinder is especially useful in grinding the valves on

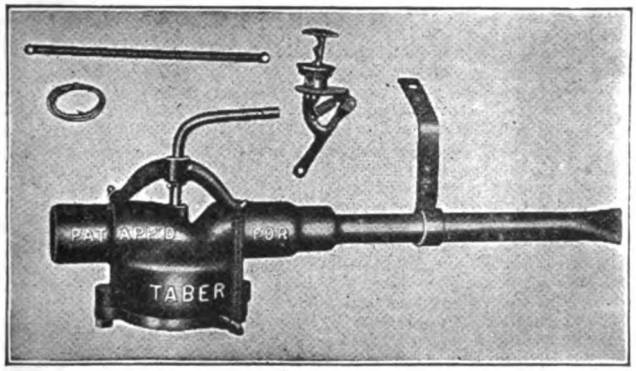


the fourth cylinder of the Ford engine, which is difficult to reach with the ordinary grinder.

The tool is of simple, sturdy construction throughout. The universal joint is formed simply by pinning the tool head to the shank with a pin, which is much smaller than the hole, through th· shank. A coiled spring between the head and the shoulder of the shank takes up all looseness and holds the head normally square with the shank.

Manufactured by Hudson Motors Specialties Co., 1932-34 Arch St., Philadelphia, Pa. Price, $1.50.

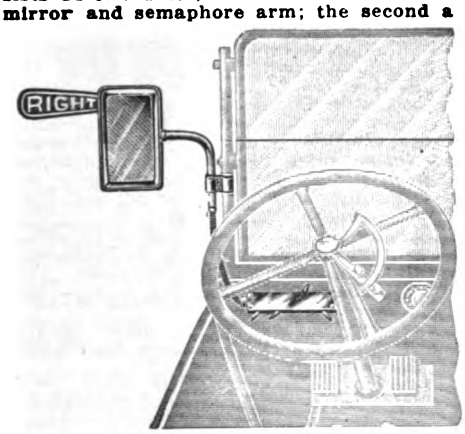
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Combined Muffler and Cut-Out. The Taber Combined Muffler and Cut-Out for Ford cars consists of a casting that fits onto the exhaust pipe in place of the regular muffler. It is claimed by the manufacturer to reduce back pressure to a minimum and is guaranteed against blowouts for the life of the car. The cut-out is embodied in the main casting and is self-cleaning, there being but one working part. The casting is rigidly held in place by brackets that fasten to the frame, so that it cannot work loose or rattle. It has been tried in very severe conditions and has been adopted by a number of prominent concerns in the automotive industries.

Manufactured by the Emco Manufacturing Co., Inc., Binghamton, N. Y. Price, $4.85 retail; West of the Rockies, $5.

Semaphore Auto Signal. With the ever increasing number of automobiles on the streets and the consequent multiplication of the traffic problems the semaphore auto signal has been designed. This device consists of two units; the first a combination mirror and semaphore arm; the second a



dash control. By the control the semaphore may be set in either of three positions, right, left or stop. The color scheme of the semaphore arm is striking, the letters on all positions are black, but for the three positions are on different colored fields. For right the field is green; for left, white, and for stop, red.

Manufactured by Semaphore Auto Signal Co., Inc., 1790 Broadway, New York. Price, $12.50 complete.

"Duo-Cord" Tires. The extra flexibility of cord tires, their easy riding qualities, freedom from blowouts and saving of gasoline are points widely known. "Duo-Cord" tires follow the best practise of the finest cord tire construction. The easy riding qualities not only add to the pleasure of car use, but save repair bills. The extra strength to resist blowouts is due to each cord being surrounded by rubber, thus strengthening the cord (as a shoemaker waxes his thread) and preventing frictional heat. Gasoline saving results because the quick resilience does away with the drag of stiffer tires, making the car run much more easily.

"Duo-Cord' tires are priced somewhat lower on most sizes and materially lower in small sizes, only because they are sold closer to cost.

The Double Fabric Co. began in the early part of cord tire development to work out the clincher type of cord tires. For more than two years the company has been successfully building Ford sized cord tires.

The "Duo-Cord" in Ford sizes is an all-cord tire without any intermediate plies of fabric and is made exactly like the same high quality of the largest sized cords.

Ford sized "Duo-Cord" tires have the advantage that they can be used right along with any fabric equipment the owner may have until such time as his fabric tires are no longer serviceable.

Not only is the Brazil Rubber Gray Inner Tube extra thick for a pure Para tube, but Brazilian rubber is used, which, while more expensive, is stronger and tougher than the plantation rubber generally used. The result is an inner tube which not only holds the air unusually well and is free from slow leaks, but also a tube which will not dry out and crack in years of use, and one that if torn or damaged can always be perfectly repaired. All "Brazil Rubber" tubes are laminated construction, being built of from four to six plies.

Manufactured by the Double Tire Co., Auburn, Ind. Distributed by Farley & MacNeill, 105-107 Federal St., Boston, Mass. Prices: "Duo-Cord" Tires, $24.70 to $83.40; "Brazil Rubber" Gray Inner Tubes, $3.45 to $11.05.

The "Sioux" Bushing Remover. The "Sioux" Bushing Remover is simple and effective. You simply screw it into the

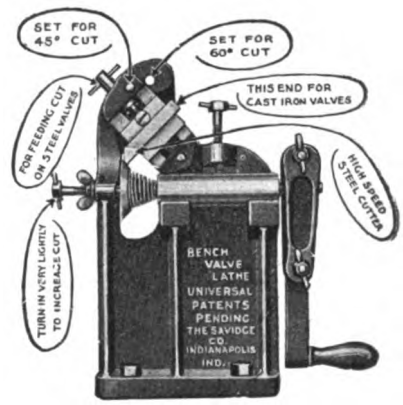


bushing, in which it cuts its own threads. This gives a grip on the bushing, which can then be driven out from the back. The No. 20 "Sioux" Bushing Remover is for use on blind bushings—those which cannot be driven out from the back. The tool is screwed into the bushing and then a center piece is screwed through the No. 20 "Sioux" Bushing Remover with jack screw effect, until the bushing is removed. The "Sioux" Bushing Remover will do the work in a short time and with less labor.



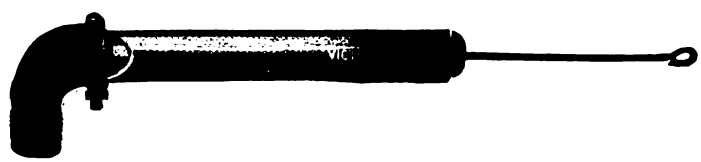
Manufactured by Albertson & Co., Sioux City, Ia. Prices: No. 51, Ford set, $10 complete; No. 50, for all cars, $18 complete; No. 20, for blind or pocket bushings, $5.

The Universal Valve Lathe is light, compact and cuts quickly and easily. It can be clamped in a vise or held in one hand and operated with the other. One does not have to be a machinist to operate this lathe. While it is made for any size valve the two steel sleeves furnished,



one for 5/16 valve stem and one for ⅜ sizes, will handle 90 per cent. of the valves on the market. Each lathe is fitted with a high speed steel cutter ground ready for use.

Manufactured by A. C. Savidge, 611 N. Capitol Ave., Indianapolis, Ind. Price, $10. Extra sleeves, 75 cents. Extra cutters, 75 cents.

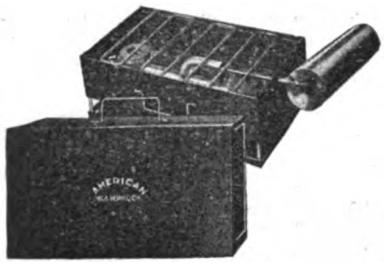


Victory Siren. This is a new warning signal that has a range of two full octaves and innumerable tone combinations. Attached by anyone in a few minutes.

The Victory Siren is a polished brass horn, so constructed that is cannot break or become inoperative. It will not cause back pressure in the exhaust manifold. The signal will serve as well for trucks as for passenger cars. It can be used as desired to make signals, either loud or modulated as conditions justify. It operates from the steering wheel by a cord. It may be attached to the exhaust manifold with a few minutes work.

Manufactured by the Inter-State Tool and Manufacturing Co., 3419 Rutger St., St. Louis, Mo. Price, $2.50 complete.

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American Folding Kampkook Stove. It is built for automobilists, the campers, hunters and sportsmen and is an efficient and serviceable camp stove that has all the qualities that are desired for camp cooking.

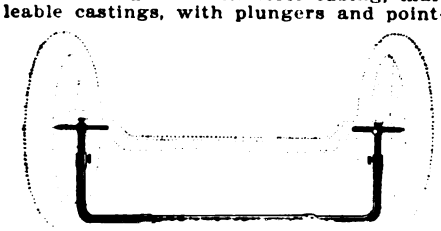
The maker claims that the Kampkook stove can be made ready for use by simply removing the cover and placing the tank in position when it is ready to light. There are no loose parts to lose, nothing to assemble and no alcohol torch is required to light it. The cover serves as a stand or base upon which to set the stove, so that it stands level and firmly wherever placed.

The stove burns ordinary gasoline, which may be purchased anywhere. The tank holds a sufficient quantity to run both burners for two and one-half hours at full capacity. A small hand pump is provided with each stove and a few strokes is all that is necessary to obtain a pressure that will force the gasoline to the burners, where it is gassified. The stove burns with a clear blue flame that can be turned up or down at will. Only the first burner must be generated. This produces gas for the second burner, which may be turned off or on at will.

The Kampoven is an extra for the Kampkook stove and is a very desirable accessory for baking potatoes, biscuits or doing all ordinary baking or broiling. It can be quickly heated to baking temperature and will maintain a uniform heat. It is made entirely of steel and assembled by slip joints. No bolts, screws or clamps are used in its construction. It folds flat and packs into the Kampkook case. The weight is three pounds.

Manufactured and sold by the American Gas Machine Co., Albert Lea, Minn. Prices on application.

Auto Running Gear Aligner. A practical method of aligning the front wheels of an automobile is a necessity in every repair shop. A tool that meets this need is the "Auto Running Gear Aligner." It consists of a one-inch steel tubing, malleable castings, with plungers and point-



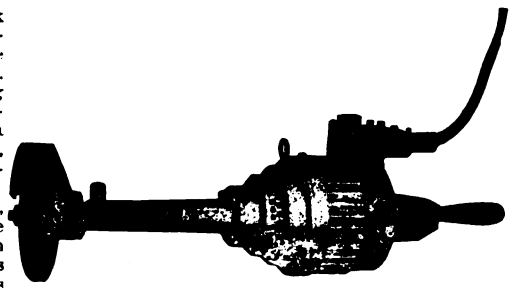
ers of steel, nickel plated; a graduated scale, etched on brass, inlaid with silver, with figures in white on a black background.

When in use the two center brackets rest on the floor, the pointers being adjusted to the centers of the tires at the front. With this adjustment of the pointers made the stand is placed in back of the axle in a similar position, and the position of the pointers noted in relation to the previous setting at the front of the tire. The difference as shown by the scale will prove the correctness of the alignment and will determine how much the tie rod shall be taken up or lengthened By this method the maker claims the adjustment of the wheels can be made accurately.

Manufactured by the Mechanical Utilities Corporation, 5 North La Salle St., Chicago, Ill. Fully guaranteed. Price $10.

Van Dorn Aerial Grinders. The Aerial Grinder is an economical tool that can be used for many works in a garage and repair shop. It can be operated in very limited space and work can be done that would not be otherwise practical. It can be connected to any electric light fixture. It is constructed for single phase circuit, is one-third horsepower and is wired for a 60-cycle alternating current. It is equipped with one six-inch wheel, wheel guard, 10-foot electrical conductor with attachment, plug and fuses and suspension spring.

The rotor shaft is mounted on two annular ball bearings and the design insures perfect alignment. The wheel end of the extension shaft is supported by a bronze take-up bearing, which has a very simple adjustment.



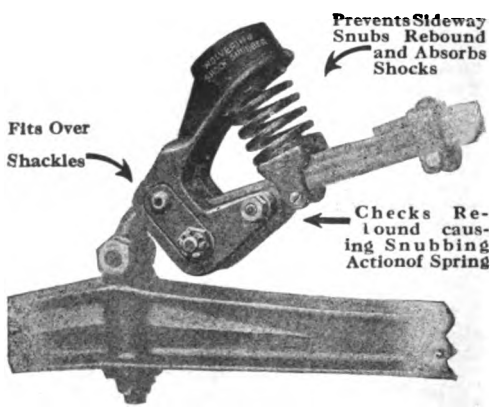
This machine is adapted for all kinds of light grinding, such as auto body work, dressing gas and arc welds, grinding castings and the like.

These grinders are made in sizes for all classes of work, such as grinding in a lathe, the work being held in a chuck, and the grinder fastened to the bed of the lathe. They are made for either direct or alternating current.

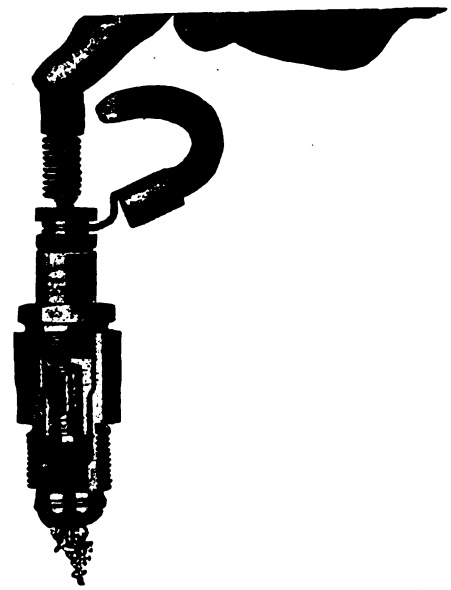
The Van Dorn Co. also manufactures a series of electric drills for garages and repair shops, for use with either direct or alternating current.

Manufactured by the Van Dorn Electric Tool Co., Cleveland, O. Prices on application.

Shock Snubber for Fords. A new shock snubber for Ford cars that is claimed by the manufacturer to prevent sidesway, absorb rebound or back throw, prevent spring breakage, increase tire mileage, prevent accidents, increase steering efficiency and relieve driving fatigue, has been placed in the market. It follows the usual construction of shock absorbers, but the side plates and castings are much heavier than those of other types and the added strength is claimed to prevent failures that are often experienced. The snubbers are fastened to the ends of the springs in the usual manner by removing the regular spring bolts and replacing them with the bolts and shackle of the absorbers, the forward ends of the absorbers being clamped to the springs of the car beneath the spring seats of the absorber. This accessory carries the regular guarantee.



Manufactured by the Wolverine Parts Co., Hastings, Mich. Prices on application.



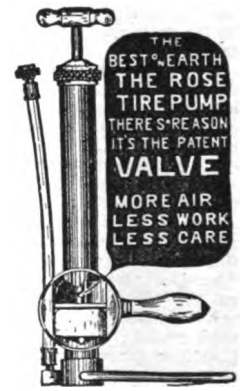
Push Clean Spark Plug. It is an undisputed fact that the functioning of a gasoline engine is entirely dependent upon the action of the spark plug. If this useful device is broken, short circuited, or covered with carbon and oil, it makes no difference how well the rest of the machine is working, the engine will not give results.

The Push Clean Spark Plug is an innovation in spark plug design. It is both new and unique and claimed to be 100 per cent. efficient. This device consists of the conventional base, porcelain and center electrodes. The feature is the movable center electrode which is so constructed that by pressure upon the insulated top it may be pressed down, scraping away the carbon from the inside of the porcelain, as well as from the spark gap.

Two seconds time will suffice to clean all four plugs, as there is no necessity for their removal from the engine. The illustration gives a clear idea of the construction.

Manufactured by Wellman-Howe Manufacturing Co., 21 E. Van Buren St., Chicago, Ill. Price, $2.

Rose Tire Pump. The Rose Tire Pump is a single cylinder pump having patented features that the manufacturers claim make it far superior to other pumps and insures a supply of air at all times without wear. A heavy cup shaped leather is used on the plunger, air entering through the plunger rod instead of around the plunger. In the construction of this pump friction is practically eliminated, insuring

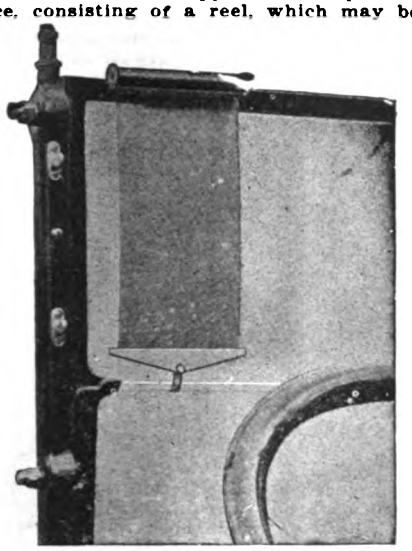


a full supply of air in the pump, with positive pressure and no leakage in the pump valve. It is made of heavy steel throughout. The Rose tire pump with its patent valve, the manufacturers claim, reduces the labor of inflating tires, making the work easier, quicker and more positive.

Manufactured by the J. H. Haney & Co., Hastings, Neb. Prices, $3 and $3.50.

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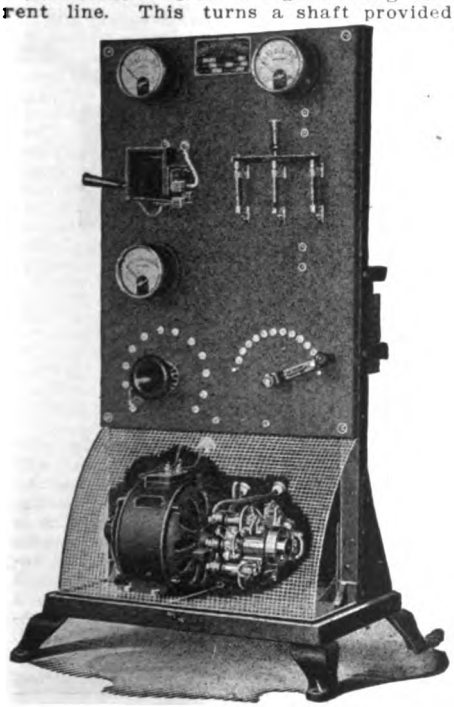
Sales Auto Glare Stopper. Every driver has at some time or other suffered the inconvenience and is aware of the danger, due to the excessive glare from the headlights of another automobile which is approaching. Some states in order to restrict the danger of accident resulting from the operator being blinded by this excessive light, have passed laws prohibiting the use of glaring headlights. The Sales Auto Glare Stopper is a simple device, consisting of a reel, which may be



attached to the top of the windshield. Upon this reel is carried a strip of colored celluloid, in a simple manner to which the ordinary window curtain is carried. At night the colored celluloid strip may be pulled out and fastened to the lower part of the windshield. Thus the blinding rays of the headlights are softened by the action of the celluloid and accidents are prevented.

Manufactured by Sales Publicity Co., 25 Carlton Court Building, Buffalo, N. Y. Price, $1.

The Stahl Rectifier. Alternating current cannot be used for charging storage batteries; it must be converted to direct current before it can be used. This is the function of the Stahl rectifier, which is a low priced rectifying apparatus for garage work. The essential features are a small synchronous motor of special design operating from the alternating current line. This turns a shaft provided

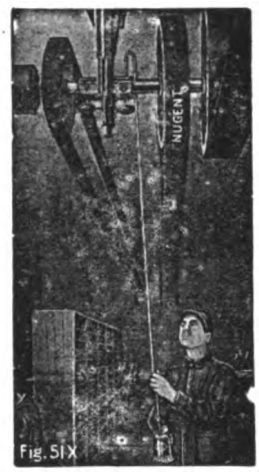


with collector rings and a direct current commutator. Alternating current is brought to the collector rings through brushes, taken from the rings and passed to the commutator and finally taken from the commutator as direct current by another set of brushes. The switchboard, mounted on the same frame as the motor, is provided with all the necessary switches, regulating devices, measuring instruments and automatic features. To charge a battery it is only necessary to insert a cable plug and close a switch.

This machine is made in two styles. One is for a single circuit. The other, which is for two circuit work, is illustrated in our cut.

Manufactured by the Stahl Rectifier Co., 536-538 South Clark St., Chicago, Ill. Price quoted at request.

Nugent's Shaft Oiler prevents accidents, as it does the job from the floor, saves oil and time and reduces danger to a minimum. The can holds two quarts of oil and is made of very heavy material. The pump, barrel, plunger and ball check valves may be examined, repaired, replaced or recleaned at any time, as all parts are easily accessible. The opening for the long spout is tapped one-quarter of an inch (pipe tap), so by using an elbow or a 45 degree L at this point the spout may be set at right angles or 45 de-



grees. The curved nozzle at the top end may be changed to suit conditions.

Manufactured by Wm. W. Nugent & Co., Chicago, Ill. Price quoted at request.

The Whitney Gas Humidifier. This apparatus consists of an upright cylindrical task, which is a reservoir for water and contains only a float valve and a lead pipe, which is attached to an outer connection and an adjustable needle valve. From this lead, copper tubing connects the humidifier with the manifold. When the motor is started the vacuum action in the intake manifold is effective throughout the entire system, vaporizing the water and uniting it with the gas mixture in the manifold, perfecting the combustion.

The introduction of water vapor into a motor is a carbon remover; that is, water in the combustion chamber at the time of the ignition stroke turns into steam, which prevents the formation or accumulation of carbon.

The application of the Whitney Gas Humidifier to any internal combustion motor will eliminate carbon, increase the flexibility of the motor and save fuel. Tests conducted have proven an increase of two to seven miles to the gallon of gasoline.

The Whitney Gas Humidifier is manufactured in two models for cars and a smaller size, No. 3, for motorcycles. The two sizes for cars are No. 1 and No. 2. Both are alike, the difference being in water capacity. Approximately 300 miles



may be obtained with one filling of No. 2 and 150 miles with No. 1.

Manufactured by The R. S. Whitney Manufacturing Co., 74 Nichols St., Lewiston, Me. Prices, No. 1, $8.50; No. 2, $10.50; No. 3, $8.50.

"Rusco" Brake Lining and Clutch Facing. Claim is made that more than 39 years of experience are represented in the



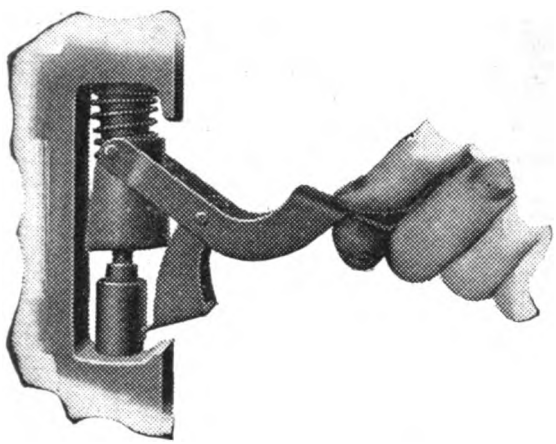
development of the looms which weave Rusco products and more than 25,000 shuttles are now engaged in Rusco manufacture. Only the best grade of Canadian long fiber asbestos is used in the manufacture of Rusco products. This fiber is solidly interwoven with fine brass wire (no copper wire being used) by powerful looms that insure a close, uniform weave. The fabric is impregnated with a highly developed heat and wear-resisting compound which is not affected by oil, water, grease or dirt. The material is soft and pliable with a close hugging friction surface, positive in its response to braking conditions. It is woven to correct size by special equipment and does not have to be rolled to size in fitting. This makes for elasticity and long life. The fabric retains its texture unstiffened and is unweakened by the crushing pressure of rolling.



Beside Rusco brake lining, clutch facings are also manufactured from the same material as the brake linings. These are made in stock sizes and adapted for practically all cars and trucks.

Manufactured by the Russel Manufacturing Co., Middletown, Conn. Prices and literature on application.

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Tu-Ford Valve Lifting Tool is a handy tool for removal of Ford valves by compressing the springs so the keys may be taken out. It is small enough to be carried in the car tool kit. As shown in the cut it is a small lever like tool having a cup that may be placed around the base of the spring, the foot or pedestal bearing against the crank case and the push rod housing. Pressing the lever toward the foot and down and inward lifts the spring clear of the locking key and locks the tool in position for the key's removal. To remove the tool after the valve and key have been replaced, simply pull out the handle.

This tool will be very useful to the Ford repair man as well as the private owner who does his own valve grinding. It will save its cost price many times over in time.

Manufactured by the Tu-Ford Valve Tool Co., 210 Boutell Place, Bay City, Mich. Price, retail, 75 cents each.

Exemplar Cleaning Polish. The polish for cleaning and washing your car. No matter how dirty or muddy it may be a single application of Exemplar Cleaning Polish will leave a bright, thoroughly clean polished surface and it will not collect dust. It is easy to use. No spraying is necessary. Simply rub over your car with a moistened cloth and then wipe dry. Exemplar Polish will positively re-

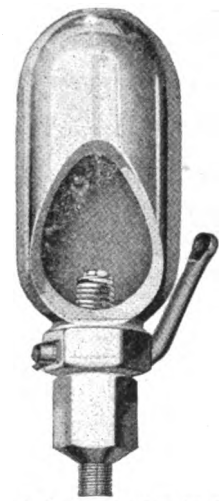


move tarvia or oil without scraping or otherwise damaging the finish. It is non-inflammable and will not deteriorate any finish.

Other articles handled by this company are Genolite, an electric starting motor for Ford cars; Speederator, an accelerator for Ford cars; Automatic Extension Reel for use with an inspection lamp in a garage; Eveready Madza Lamps for automobiles; the Eveready Starting and Lighting system for Ford cars, and the Eveready Storage Batteries.

Sold by Pettingell-Andrews Co. (Automobile Division), 100 Brookline Ave., Boston, Mass. Prices and literature upon application.

Interstate Autotomotive Whistles. These are operated by the compression of the engine and produce far reaching tones that really warn. They can be attached



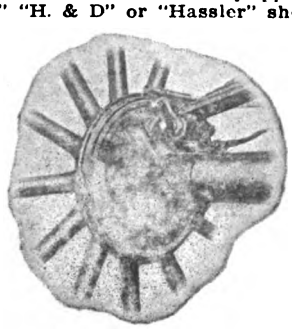
by anyone in a few minutes on the engine in a priming cup opening. The explosion produces the warning sound. Costs nothing to operate, no battery is necessary, nothing can break or cause failure, requires no adjustment and is operated by a cord attached to the steering column or any convenient place.

Inter-State Tri-Tone Whistles are constructed essentially the same as Inter-State Whistles, but these produce three distinct tones. They are designed for motorists and motor boat owners who desire a really Deluxe warning signal. Every quality of Inter-State Compression Whistles is afforded by Inter-State Tri-Tone Whistles. These signals can be used for Ford cars where there are no priming cups by installing special spark plugs. These spark plugs are made ½ inch for Ford cars; for Maxwell and Briscoe cars, ⅞ inch; for Chevrolet, Oakland and Buick cars, ⅞ inch extra special spark plug. When special spark plugs are wanted be sure to mention the make of car.

Manufactured and sold by the Inter-State Tool and Manufacturing Co., 3419-21 Rutger St., St. Louis, Mo. Prices, Inter-State Compression Whistle, $3.50 complete; Inter-State Tri-Tone Whistle, $5 complete; special attachments for engines not fitted with priming cups, $1.25.

Moore Rear Wheel Service Brake is a braking device for Ford cars and takes the place of the transmission brake. The Moore brake is a full wrap contracting type that acts on the original Ford brake drums and is operated by the service brake pedal. The transmission brake band is disconnected. The Moore brake is 100 per cent. efficient. It is positive in action, whether backing or going forward.

The Moore brake obviates chatter of the transmission and differential. The shoes are Thermoid lined and when necessary the shoes are quickly and easily relined. The brakes are operated by heavy cables, which will not stretch or rattle. The brake is perfectly equalized. This largely overcomes skidding and also insures equal wear of tires. The brake shoes are covered by protective housings. The brake can be easily and quickly attached with ordinary hand tools. Only one 5/16-inch hole to drill. Cars equipped with "W.-C.," "H. & D" or "Hassler" shock ab-



sorbers will require special extension spring perches at an extra cost of $2 a set.

Manufactured by the Tractor-Train Co., Los Angeles, Cal. Price, $16 f. o. b. Los Angeles, Cal. Installation extra.

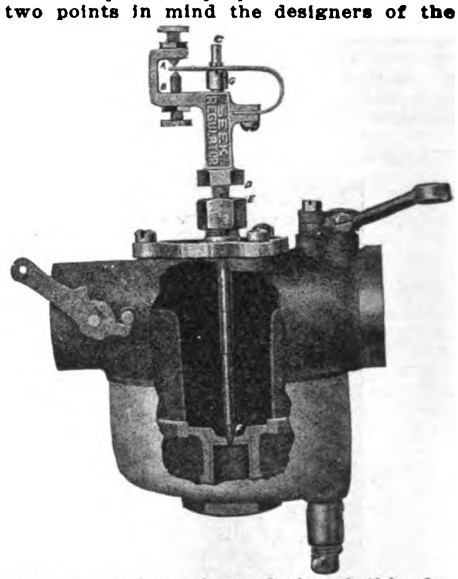
The Smith Auto Signal is a practical and efficient safety device. It is conspicuous from the front and rear. It is electrically operated from a switch on the steering wheel. It thus prevents the frequent accidents caused by removing a hand from the wheel at critical moments. The words, "left," "right" or "stop," appear at the will of the operator, and these words are clearly discernible day or night. It signals



only when you want it to, giving definite information and warning when needed in ample time to guide both those in front and those in back of you. It operates from a single-handed, three-way switch under the driver's hand. Very little current is used. It is simply constructed and easy to install.

Manufactured by the Smith Signal Corporation, 53-55 West 66th St., New York, N. Y. Retail price, complete, $20.

Seek Thermo Regulator. Every automobile owner has learned that though a rich mixture is necessary for starting, the gasoline may be partially turned off after the engine has "warmed up." Then again the faster the engine runs the greater the amount of heat generated and the less fuel is required in proportion. With these two points in mind the designers of the



thermo regulator have designed this device so that varying degrees of heat will raise or lower the needle valve, thereby admitting more or less gasoline into the mixture chamber. To apply the device it is only necessary to remove the needle valve of the carburetor and screw the device into place. After it is once adjusted the regulator automatically provides for a richer mixture for starting, and as the engine is warmed up the mixture is gradually made leaner.

Manufactured by Seek Manufacturing Co., 224 South 24th St., Philadelphia, Pa. Price, $5.

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Billmont Master Wrench. The Billmont Master Wrench is a universal socket type, designed to do the work of a dozen or more wrenches.

The maker claims that with this wrench one can reach the nuts of the fourth connecting rod of a Ford engine without removing the unit from the frame. This alone would mean a considerable saving in time when adjusting the connecting rod bearings of a Ford car. The wrench should be placed firmly on the nut to be removed with one hand and turned with the other hand. After the nut is started a spinning motion of the hand will remove it.

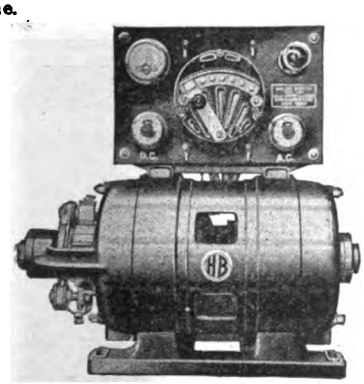


Such work as loosening or tightening nuts on radiator stud bolts, exhaust and intake manifolds, valves, rear motor supports, the clutch, starting motor—in fact, practically any part of the motor or body of a car, large or small, is reached with ease by the Billmont wrench.

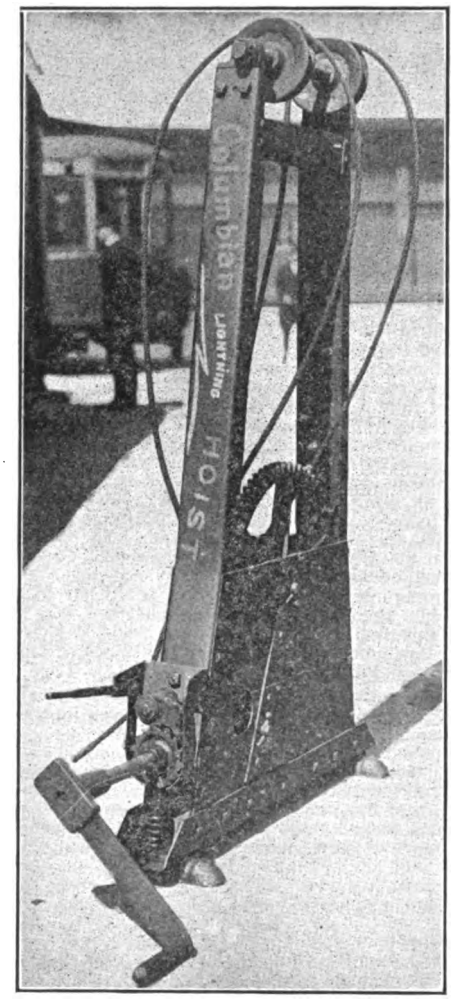
The Billmont wrench has a knurled handle so that it may be firmly held while in use, obviating the difficulty of keeping the jaws of the ordinary wrench squarely on the nut, and the nut can be spun instead of making ouly a quarter turn with each fitting of the wrench jaws.

Manufactured by the Edgar C. Guthard Co., 361 E. Ohio St., Chicago, Ill. Prices on application.

HB Motor Generator. This charger is a full 500-watt or ½-kilowatt equipment, with capacity and efficiency that guarantees quick, dependable charging and large profits. It is self-starting, using city power and from wires now installed. It will operate on either alternating or high voltage direct current. It has a special automatic universal voltage control, which makes it possible to recharge any automobile storage battery quickly and successfully. It will handle automatically six, 12 or 24-volt batteries at the same time.



Manufactured and sold by Hobart Brothers Co., Troy, N. Y. Prices on application.



The Columbian Lightning Hoist has an estimated test capacity of 30,000 pounds. It will handle with ease a five-ton load and elevate the load to a maximum height. It can be operated by one man with very little effort.

A dump body equipped with a Columbian can be raised to an inclined position of 30 to 50 degrees in less than two minutes. The hoist is designed on the principle of geared wheels. By a train of spurs and bevel gears the Columbian is so constructed that a load of five tons can easily be raised by one man at the crank.

The hoist occupies but eight inches of space back of the driver's seat. This is an important advantage, as it permits the body load to be set forward, relieving the rear tires, spring, frame and axle of an excessive share of the weight of the load.

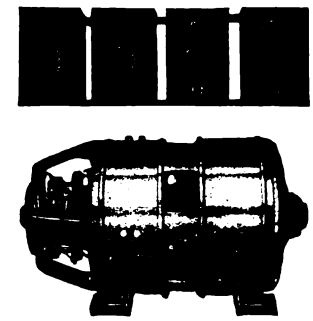
Another feature to be considered by the truck driver is the weight of his equipment. The Columbian is of the lightest weight consistent with the proper strength, thus allowing a dump body of a larger carrying capacity. It fits any chassis or frame, and can be easily and quickly attached. The appearance is attractive.

Manufactured by the Columbian Steel Tank Co., 1601-1621 West 12th St., Kansas City, Mo. Write for prices and further information.

HB Motor Generator Charging Sets. The HB two kilowatt generator set, or 32 battery charger, is designed for battery service stations, or garages that specialize battery charging, or wherever large capacity and economy of operation may be desired. It is equipped with an amply designed five horsepower motor and is built to give heavy service profitably.

It will develop at the generator end 60 to 70 volts and 30 amperes and has a charging capacity of 32 six-volt batteries or their equivalent at one time. The armature and rotor are mounted on one shaft supported by ball bearings, insuring absolute freedom from operating trouble and maximum economy in operation. This equipment is furnished in two or three-phase winding or for direct current, and by the addition of a starting box will operate on single phase 220 volts. A charging outfit of this large capacity cannot be used on single phase 110 volt lighting lines, but a public service company will put in the necessary power lines for this machine.

There are four separate charging lines, each with a maximum charging rate of 10 amperes, and capacity for carrying up to eight batteries. Individual panels make

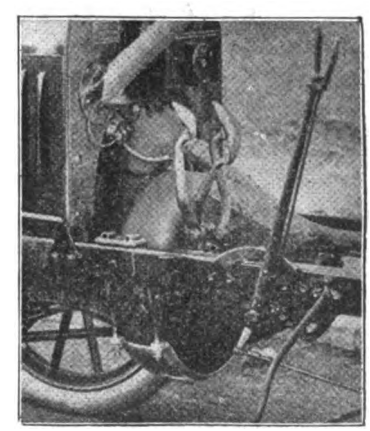


each charging line independent of the others, and provide the necessary balancing resistance in each line of batteries, and additional resistance on the line for varying the charging rate and for adjustment when less than eight batteries are charged on a single line. Each charging panel has its own ammeter, necessary fuses, cutouts, rheostat, with the resistance for balancing the line and varying the rate of charge. The panels are of clear black electrical slate, oil finished and beveled.

Manufactured by the Hobart Brothers Co., Troy, N. Y. Prices on application.

Liberty Motor Support. The Ford power plant is supported at the rear end by two brackets bolted to the flywheel bell housing. Should one bracket be broken the engine is supported by but one, which must take all the driving thrust upon the engine case. The Liberty motor support is attached beneath the flywheel case and fastened to the frame on each side. The maker claims that it will prevent the breakage of the brackets, will stop all vibration or shaking of the motor which crystalizes the forged brackets and causes them to break; that it will prevent slippage of the high speed and transmission bands, giving more pulling power.

This device not only prevents breakage of the crankcase brackets, but serves as a repair in case the brackets are broken until such a time as a repair can be made. The support can be installed in a very short time.

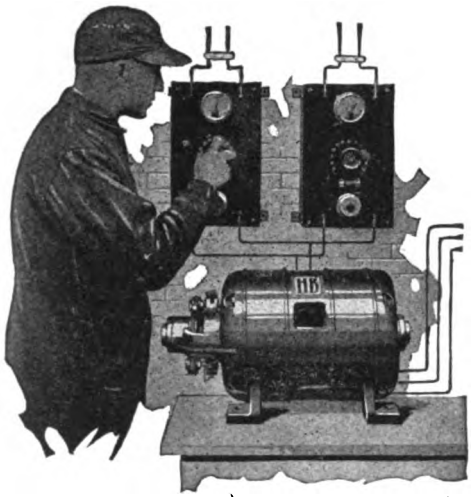


Manufactured by the Motors Support Co., 431 S. Dearborn St., Chicago, Ill. Sold through the dealer and jobbing trade. Price, $4.

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HB-16-Battery Capacity Charger. The HB-16-Battery charging set is a new outfit, designed for the average size garage, where the increased demands for battery charging necessitates larger capacity than is afforded by the smaller sizes.

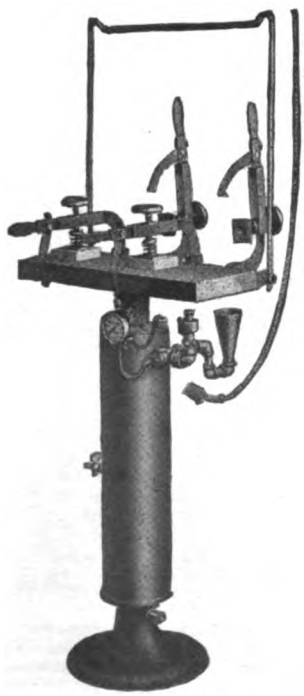
The charger is a sturdy, reliable machine of one KW capacity, with capacity for charging one to 16 six-volt batteries, or their equivalent in 12 or 24-volt batter-



ies at one time. It is built extra strong and of wear resisting materials. It operates on two or three phase city current, but not on single phase. Most garages have the current available, and, if not, the city plant can easily supply the necessary lines. There are two separate, independent charging panels, each built to carry up to eight six-volt batteries. Each panel is complete with its own ammeter, fuses, cutouts, rheostat, etc., and with resistance for balancing the line and varying the rate of charge. The panels are of clear black electrical slate, oiled and beveled. A special feature is the HB universal automatic voltage control, whch permits the charging of six, 12 or 24 volt batteries at the same time.

Manufactured and sold by Hobart Brothers Co., Troy, N. Y. Prices and payment terms on application.

Sepco Steam-Electric Vulcanizer. In this vulcanizer temperature variation in the plate is controlled within one or two degrees by an ingenious pressure gauge, which opens and closes the electric circuit as the steam pressure rises or falls



one pound. The steam generator is a seamless steel tube two inches diameter on which is wound an electric heating coil, imbedded in an insulating compound. The cable connection can be plugged into any electric light socket and the vulcanizer can be used anywhere without regard for fire ordinances.

Sixty pounds of steam can be obtained in 10 or 12 minutes after connection is made and after the necessary temperature is obtained the current draft is only half the time. In actual operation the current is closed and broken at one minute intervals, the circuit being regulated automatically.

These vulcanizers are built in two sizes, one with four pressure arms and a plate eight by 20 inches, and the other with six pressure arms and a plate eight by 30 inches. The heavier of the two weighs 125 pounds complete and one square yard of floor space is required for it.

Sepco Vulcanizers are constructed of steel throughout, insuring great strength and light weight. It is stated the tube plates have been tested to pressures of 600 pounds to the square inch without rupture. Because of the automatic control of temperature the machines are claimed to be safer than other vulcanizers, including those with thermostat control. The pressure gauge regulation is stated to be the simplest and most positive and is patented. Other devices made by this same concern are Sepco celluloid plates, Sepco glue pots, etc.

Manufactured by the Steam-Electric Products Co., Cleveland, O. Prices and literature on application.

Mormiles. This is a chemical compound that is manufactured in the form of a tablet that is put into the gasoline tank and dissolves in the fuel. It is claimed to energize low grade gasoline so that it is



wholly consumed and produces full power. The maker maintains that unlike a liquid it becomes a part of the gasoline, as it evenly dissolves, and the ingredients pass out of the engine with the exhaust. It is in convenient form and may be added to the gasoline in the ratio of one tablet for each gallon.

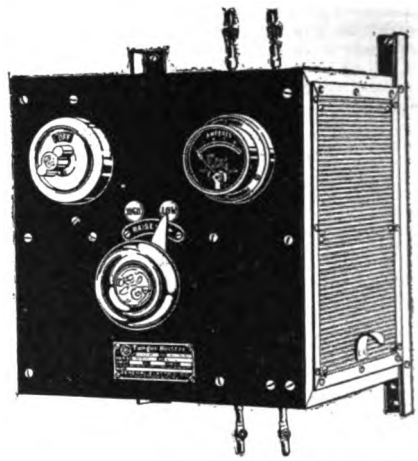
Is guaranteed by the manufacturer not to damage the engine, to increase the mileage, to increase the power and to keep the engine free from carbon, or the money will be refunded. In red cans only.

Manufactured by Mormiles Co., 226-8 S. La Salle St., Chicago, Ill. Price, $1.

Tungar is a battery charging rectifier for public garages and service stations. The six-ampere 75-volt type of Tungar rectifier is a simple, low priced, highly efficient charging set that will charge from one to 10 three-cell starting and lighting batteries at a six-ampere (or lower) rate from an alternating current supply.

Tungar rectifier superiority and efficiency may be attributed to the bulb transformer—the essential difference between the Tungar rectifier and other rectifiers dependent upon mechanical transformers. Because of this ingenious invention Tungar insures a low first cost, a low operating cost and absolutely elim n ates the possibility of the battery discharging through the rectifier. No. A 63,951.

A smaller size is sold by the same company, for the use of the private owner, and may be used in the car or in the garage. It is a six-ampere, 15-volt Tungar



rectifier developed by the Research Laboratory of the General Electric Co., and is a simple, economical rectifier for charging a three or a six-cell automobile starting and lighting battery. To charge a battery with the Tungar rectifier, simply connect the two leads to the battery, screw the plug into the nearest lamp socket and snap the switch. No. A 3411.

Sold by Pettingell-Andrews Co. (Automobile Division), 100 Brookline Ave., Boston, Mass. Prices and literature upon application.

Red Star Timer for Fords. The timer of Ford cars has always been more or less a source of trouble. In fact, this has developed to such proportions that the demand for a timer that would really wear has followed automatically, and this is the reason why the Red Star Timer for Fords has gained quick favor with Ford vehicle owners.

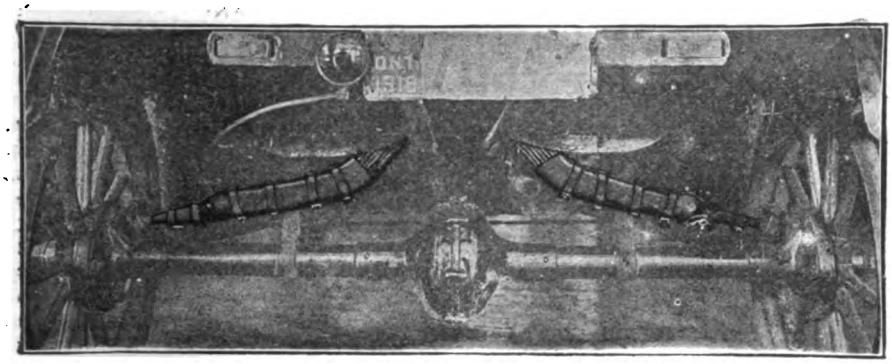
In building this timer special attention has been given to the parts that wear out the quickest, namely the race and roller. The Red Star Timer race is made of the best quality bone fiber. It is natural color and cured until it is very hard and durable. It is also made of one piece throughout and not built up in layers. Therefore, crumbling and coming apart are impossible.

The roller of the Red Star Timer is designed to roll under all conditions. The roller on a roller principle is applied, giving virtually a roller bearing roller. This reduces wear to a minimum and tends to give extremely long life and lots of service. Each Red Star Timer is stamped with a Red Star right on the timer shell.

Manufactured by the Auto Components, Inc., 56 East Randolph St., Chicago, Ill. Price, $1.75.



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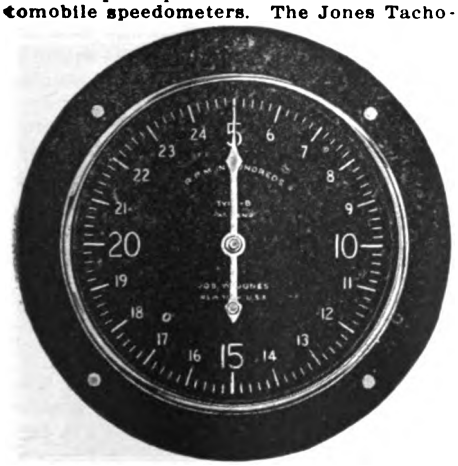
Spring Covers for Ford Cars. Woodworth Lubricating Spring Covers with strap-on fastening are now made for Ford cars. The covers are made of leather and imitation leather, oil and water proof. The straps that hold them to the springs take all wear, so the covers last indefinitely. Inside of the covers are felt linings of large size saturated with oil enough to last for a year, the maker claims. The covers can be re-oiled from an oil cup or may be removed and saturated with oil. It is claimed these covers lubricate the springs and keep out the dust and dirt.

Manufactured by the Woodworth Manufacturing Corporation, Niagara Falls, N. Y. Price, a complete set in a box, genuine leather, $3.50; imitation leather, $2.50.

The Jones Automobile Tachometer. The Tachometer is an instrument which shows how fast the crankshaft of the engine is revolving. It indicates continuously revolutions per minute. Tachometers differ from speedometers in that the latter though much the same in principle, indicate the speed of the car over the ground in miles an hour.

The principal use of Tachometers is to detect engine trouble. They should be used in adjusting engines to speeds of greatest efficiency, in performance tests and operating cars at the most efficient engine speeds. For speed cars this instrument is particularly valuable, and where maximum efficiency is required it is more reliable than are the human senses.

Automobile Tachometers are much the same in principle and construction as automobile speedometers. The Jones Tacho-



meter was originally designed for aircraft and because of the more severe conditions and requirements there are fewer satisfactory types of airplane Tachometers than automobile speedometers.

The centrifugal Tachometer is so constructed that the centrifugal force, or the tendency of a body to fly away from the axis of rotation, depending on the speed of rotation, acts against the elastic force of a spring. The amount of deformation of the spring determines the motion of the pointer and this indicates the speed. The deflection is continuous, but not strictly proportional to the speed. This disproportionality is compensated in the Jones instrument by a double adjustment device.

The Jones Automobile Tachometer is claimed to be extremely accurate in mechanism and the only centrifugal instrument yet produced embodying a perfectly uniform scale, and other manufacturers find it necessary to calibrate each individual dial, which makes for an unevenly spaced scale, the graduation being crowded on parts of the dial, causing confusion in reading. The dial on the Jones instrument is of greater length and openness than any other instrument of its type yet designed, insuring instantaneous and accurate reading of the smallest speed variation.

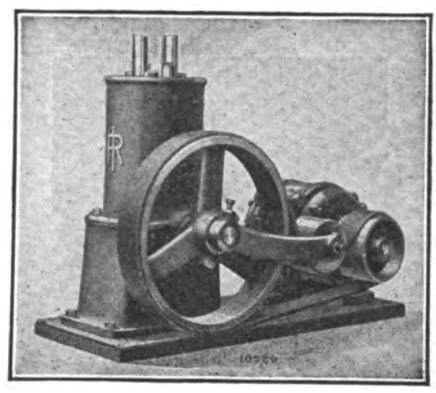
It is extremely light in weight, is not affected by temperature changes as is the magnetic type of instrument and has no magnets to lose their attraction in use. The governor system operates at high speed and being very light insures great accuracy. The entire mechanism is so simple that it requires absolutely no attention once it is installed.

The frame and casing of the instrument are aluminum alloy, black enameled. All rotating parts operate on ball bearings. The dial is black with white indications or vice versa, reading from 500 to 2500 revolutions per minute or 1000 to 5000 revolutions per minute—luminous or plain figures as desired.

The instrument is a flush mount type and can be set in the dash board of any automobile. It is driven by a flexible shaft from the engine and is supplied complete with shafting and all necessary fittings.

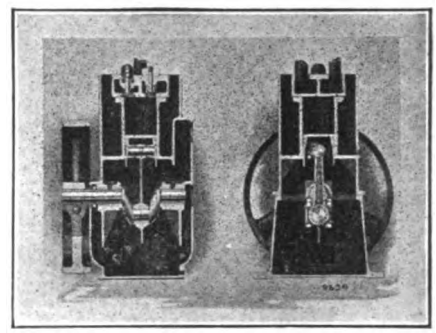
Manufactured by the Jones-Motrola, Inc., 29-31-33 West 35th St., New York, N. Y. Prices and literature on application.

Imperial Fourteen Compressors. These machines were built in large numbers to meet a war demand and have been tested for long periods of service. They have now been placed in the market for commercial sale. They are built in four sizes and the capacity ranges from three to 45 cubic feet of air a minute at pressures to 100 pounds a square inch. The small compressors can, however, be used for pressure requirements up to 200 pounds a square inch, the horsepower needed being, of course, slightly increased. They



are single acting machines of a vertical type built for belt drive. Where driven from a line shaft, tight and loose pulleys are supplied; where the use of an independent motor is planned they are ordinarily furnished as a unit complete with motor, endless belt and short drive attachment. In the latter case a hard wood base plate is included with the standard equipment.

The machines are so well balanced as to operate satisfactorily if bolted to any solid flooring, but where permanency of installation is desired the building of a concrete foundation is advocated. The smallest size is built with a ribbed cylinder for air cooling where the service is intermittent, and with a water cooled cylinder of the reservoir type for continuous operation. Larger machines are water cooled only, employing the reservoir jacket system



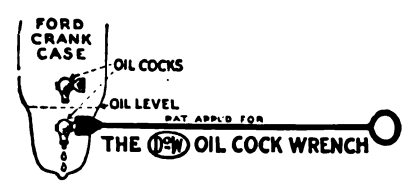
except that in the case of the largest size a closed jacket for connection to a pressure system is optional. In this connection it is worth noting that the reservoir cylinder design affords unusually ample water capacity and that both cylinder and head are cooled. The manufacturer states that a single filling of the water jacket will suffice for a 10-hour run of the compressor.

In general design the Imperial Fourteen Compressors remind one strongly of an automobile engine. There is the same drop forged crankshaft and connecting rod, the die cast removable bearings, the automatic splash lubricating system and general ruggedness and simplicity which has come to be recognized as guarantees of satisfactory service under all sorts of operating conditions.

It is pointed out, however, that these little machines were designed to meet exacting efficiency test and that while simplicity was sought, efficiency was the chief requirement.

Manufactured by the Ingersoll-Rand Co., 11 Broadway, New York, N. Y. Prices on application.

Oil Cock Wrench. Every Ford car owner who has been obliged to reach beneath his car to find out the level of oil in the crank case by opening the petcock in the transmission case, thereby getting his clothes soiled by dirt or oil, will appreciate the utility of the tool illustrated. It is called the Dow Crank Case Oil Cock



Wrench. As the handle is 25 inches long, with this tool the oil cocks may be opened and closed without reaching by hand underneath the car. It is well made and finished in black enamel. This tool is also useful for opening or closing the cock on the bottom of the radiator.

Manufactured by Dow Wire and Iron Works, Inc., Louisville, Ky. Price quoted at request.

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Warns of "Leagues" Offering Bargains in Auto Accessories

"BEWARE of the so-called league that offers bargains in accessories," says Richard H. Lee, special counsel of the Associated Advertising Clubs.

"The safest, sanest way and in the long run the most economical plan of buying tires and accessories is to buy known products from dealers who are known to you—and when in a strange community, especially, or when dealing with people who are far removed, it is folly to believe that a motorist could buy unknown goods at a low price and get satisfactory results.

"At this season when the car is being equipped for the pleasanter motoring months, the faker is lining his pockets through the fact that there is an ever new crop of people willing to believe that in some miraculous manner a stranger far away has suddenly turned philanthropist, and is going to sell them valuable merchandise at a loss.

"The so-called 'Leagues' or 'Clubs' which for an annual fee promise great reductions in all automobile accessories are perhaps the greatest menace with which the buying public has to deal.

"The International Automobile League of Buffalo, the original league, the parent of all similar organizations, was driven from the United States mails by Postoffice Department fraud orders and its president and founder, A. C. Bidwell, was indicted, tried and convicted in the United States court for using the mails in a scheme to defraud.

Worthless Junk.

"The annual membership fee required is a sort of guaranty of your 'good faith.' In other words, when you begin to suspect that you are about to be 'stung' it is up to you to go on and be stung or forfeit your membership fee. Your membership fee is a sort of guarantee that you will continue to be a sucker.

"Automobile buying leagues do not plan to sell standard or dependable merchandise. What they usually sell is worthless junk and they sell it at a high price. They sell a piece of fabric with enough rubber to cover it, made in a mould with a special name on it, by some none-too-particular rubber company under contract. They put a high mileage but worthless guarantee on it, wrap it in the same kind of paper that covers a good tire—and the public does the rest.

"Bidwell of Buffalo bought all of his oil in barrels at seven cents, it was proved at his trial; then some of it went into cans for the use on ordinary motors at 18 cents and some of the same oil went into cans marked 'for very high grade motors' at 48 cents. Yet his organization, like most of the rest, was supposed to be 'cooperative,' selling at cost—the annual 'fee' purported to cover the profit.

Shoddy Substitutes.

"The fee went in its entirety to the agent who collected it, we proved, and later the 'members' discovered that the application blank signed by them, but of which they were given no copy, was a continuous affair and many of them, who had abandoned the 'league' when they discovered its real character, were sued for amounts ranging from $50 up.

"The 'league' used the products of legitimate manufacturers as 'leaders' and then substituted its own shoddy merchandise. Its anti-freeze solution froze en route. Buying leagues are now soliciting members all over the United States. Some are like the International. They plan to milk their members as long as they will stand for it. Others are more considerate. They are looking only for the $10 membership fee, having no intention of fooling around with tires and accessories, and their 'members' will never hear of their $10 after the agent closes the door.

"They are pirates preying on legitimate commerce, conveying to the minds of their victims the impression that the automotive industry is a gigantic swindle; that legitimate business is in a great conspiracy to defraud the public.

"The one safeguard running to the public is its right to do business with a dealer whom it knows or with a factory which counts the good will of the buying public as an asset."

AUTOISTS IN VENEZUELA HAVE MANY HANDICAPS.

There are about 300 automobiles in the Puerto Cabello district of Venezuela, chiefly five-passenger cars of American manufacture, which retail at prices from 50 to 100 per cent. higher than in the United States. Consul F. A. Henry writes that while the use of motor trucks will probably increase in the future there are certain factors which tend to restrict the growth of this trade. Among these are the scarcity of skilled automobile mechanics, the enormous prices asked for gasoline, even though it is produced in the country, the poor quality of the roads, and the cheap cost and care of pack animals.

Consul George E. Chamberlin reports that about 50 tractors are in use in British Guiana, chiefly in the rice and sugar industries, and that there is no doubt the number will be greatly increased within a year or two. Owing to the soft character of the soil during the wet seasons the caterpillar type is very popular.

Haynes Automobile Co. has declared regular quarterly dividend of 1¾% on preferred stock, payable June 1 to stock of record May 20. Announcement of dividend comes simultaneously with news of enlargement of the Haynes factory to an annual capacity of 15,000 cars.

Helpful Hints for Car Owners

It is essential to have the engine warmed thoroughly before starting to adjust the carburetor, but the work may be started first and plenty of time taken doing it, so that the engine is hot when the finishing touches are given. An engine adjusted while cold will not develop full power, and an entirely different adjustment will be necessary after it heats, resulting in increase of power and gasoline economy.

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A quick test for quick carburetor adjustment may be made by pressing down on the air valve while the engine is running throttled down. A slight pressure should not change the engine speed, but a greater pressure will stall it if the mixture is correct. If the engine stalls with a slight pressure the mixture is too lean.

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A good carburetor test may be made from the seat by pulling the choker out slowly, about 1/16 inch at a time. If the engine accelerates the mixture is lean. If it decelerates the mixture may be right or too rich. Between these two tests the condition of the carburetor may be determined.

To test the adjustment on the road, run the car a few blocks throttled down. When there is a clear space ahead open the accelerator smoothly and rapidly. The car should pick speed rapidly and evenly and the engine should not struggle or give explosions at the muffler or carburetor.

Make sure that the drip outlet of your carburetor is not clogged. Find it and run a wire through it occasionally. It sometimes becomes stopped with dirt. If the carburetor leaks the gasoline cannot escape and warn you, but the mixing chamber will fill, making it impossible to start the engine.

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When testing the air pressure in your tires do not overlook the spares. It will be necessary to curb your temper if you have a puncture and find your spare is not inflated. Besides it is much easier to inflate it up with an air hose in the garage than with a hand pump on the road.

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When driving a strange car for the first time watch out for the accelerator pedal. Some of them open when the car strikes a hump or else the foot is thrown forward, producing the same effect. This causes the car to shoot forward when, by rights, it should lose speed.

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When you have the time study your starting and lighting system carefully, using your instruction book as a guide. Gradually the uses of the parts and the paths of the currents will become clear to you. Give it the care it needs and you will get better service and have less trouble in the end.

It is an admirable idea to wrap good tools, such as drills, wrenches, etc., in oiled cloths before stowing them away in the tool compartment, as the oiled cloths prevent the implements from becoming rusty, which is quite likely to happen in the course of a strenuous season's running.

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AIR TAXICABS OPERATE AT $1 PER MINUTE IN BAY STATE.

In Massachusetts one can now call an aerial taxi and get the same service via air routes that garage owners supply by motor cars. The Royal Flying Corps, a subsidiary of the Stewart Automobile Corporation, 603 Newbury street, Boston, is furnishing this service. The company has established its field at Boxford, where pilots are conducting a flying school, carrying passengers and engaging in express work. Nearly a dozen planes are already in service.

At least three other companies are planning to furnish aerial passenger and express service in Massachusetts within the next few weeks. Hotels at the beach resorts are also announcing airplane service for guests. Many former army and navy pilots will operate these machines. While regular service will be maintained between certain points, the various companies promise to furnish transportation to any place a passenger may designate. A dollar a minute is the charge.

CLOUD AGAIN ADVERTISING MANAGER FOR ADVANCE.

Kenneth Cloud has resigned from the Touzalin Agency, Chicago, to resume duties as advertising manager of the Advance Automobile Accessories Corporation, 56 E. Randolph street, Chicago. He was identified with Advance in its early days, when he directed its national campaign. Advance's advertising has become so big that the officers of the company decided to have their own advertising department.

"It is very satisfactory," says M. C. Smith, sales manager of Advance, "when I read out missionary men's reports and find on one after another—'Cork Insert and White Stripe in stock; well satisfied.' Look at these reports—from all over the United States, and most all of them from small towns. That shows we have a good distribution, and if our goods were not right dealers would not stock them. Of course, all the jobbers carry stock—they are supposed to; but it's the dealer's stock that tells the story of successful goods and distribution.

"Advance has territorial salesmen, calling on jobbers, and each salesman has two missionary men constantly combing the territory for new avenues of business. The selling plan has been met by all jobbers and dealers in a most gratifying manner and today, after two years in the field, Advance shows a sales distribution that is quite remarkable."

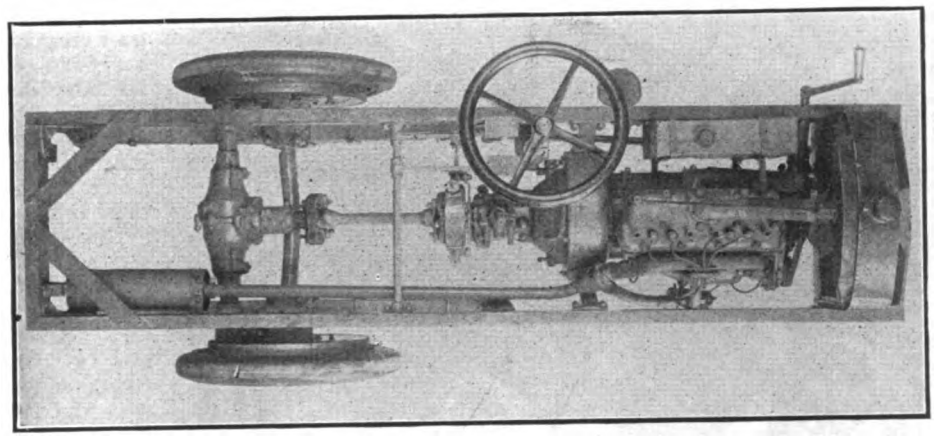


M. C. SMITH.
Advance's Sales Manager.



K. G. CLOUD.
Advance's Advertising Manager.

Clark Gasoline Tructractor Designed Directly Opposite from Automobile



The Stripped Chassis, Top View, of the Clark Gasoline Tructractor, a Three-Wheel Type, Driven by the Forward Wheels and Steered by the Rear Wheel.

The Clark Gasoline Tructractor, it is claimed, is the first specially designed gasoline industrial truck and tractor on the market. It replaces hand trucks, wheelbarrows and horse drawn equipment in factories, foundries, warehouses and the like, as well as in the construction and contracting industries in the building of roads and highways hauling and for farm work. As a truck it carries a 1½-ton load and as a tractor it will haul a number of loaded trailers.

The Tructractor has three wheels, two in front and a single wheel in the rear. The rear wheel is used for steering. The machine is designed directly opposite from the conventional automobile. The radiator is at the rear end, and what would be considered the rear end of an automobile is the forward end of the Tructractor. The driver's seat is at the rear of the engine hood and the operator sits with his back to the radiator.

A four-cylinder, four-cycle, water cooled, vertical type engine is used. The wheelbase is 72 inches and the length over all 112. The weight is 2050 pounds. A speed of one to 15 miles per hour is possible with a gasoline consumption of three gallons per day when the Tructractor is in constant use, it is claimed.

SUMMER MEETING OF N. Y. STATE AUTO ASSOCIATION.

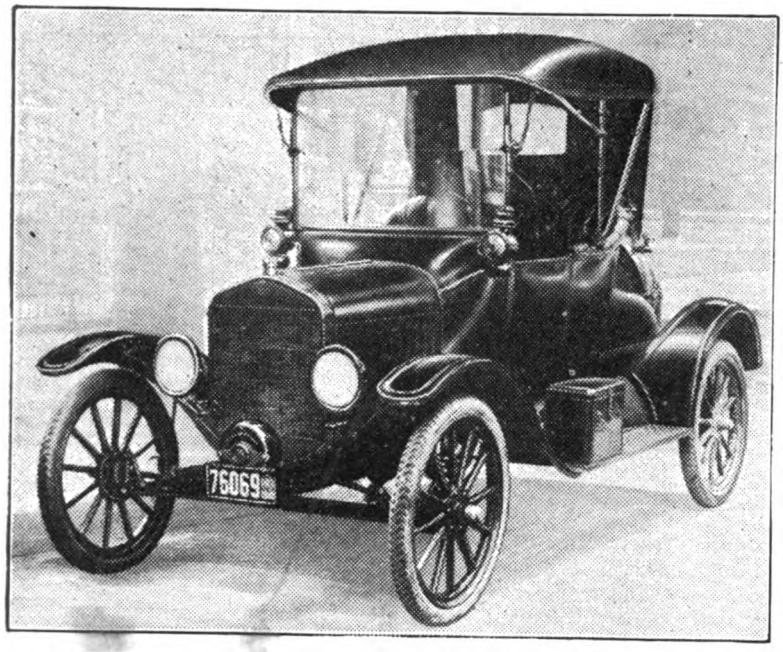
The Auburn Automobile Club has completed arrangements to receive and entertain the big midsummer meeting of the New York State Automobile Association June 23 and 24. George H. Leonard is chairman of the entertainment committee and will be assisted by subcommittees, including many prominent women of the city.

Indications are that this meeting will prove the largest of any gathering of motorists thus far in the history of automobiles. Auburn is fairly centrally located with other clubs of the State Automobile Association in the vicinity at Geneva, Waterloo, Interlaken, Ithaca, Cortland, Hammondsport, Corning, Wayland, Dansville, Springwater, Elmira, Canandaigua, Clifton Springs, Palmyra, Ontario, Williamson, Fulton, and with state roads in good condition leading from other clubs of the association scattered all over the state.

An unusually attractive program has been arranged for the pleasure of the visiting clubs.

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Dayton Starting, Lighting and Ignition System



THE Dayton Electrical Manufacturing Co., Dayton, O., is manufacturing a starting, lighting and ignition system designed for installation on Ford chassis that is the invention of Vincent G. Apple and associated engineers, which is claimed to meet every requirement of owners who desire thoroughly dependable equipment that can be installed without material or costly changes in the vehicle construction.

The system includes a motor generator unit that is mounted at the front of the chassis frame, the driving shaft of which is directly connected with the crankshaft of the engine. As a generator the unit charges a six-cell storage battery with current at six volts, and, as a starting motor, it draws current at the rate of 12 volts from the battery. Statement is made that, as a motor, the unit will develop power to turn a Ford engine at 300 revolutions a minute. The battery is carried in a box on a running board.

The starting switch is located on the frame of the chassis beneath the front floor boards, and the switch is raised slightly above the frame by blocking to position it. This starting switch serves two purposes, the one to energize the unit as a motor with battery current, and the other as a relay or cut-out to prevent the current flowing from the battery to the generator when the voltage of the battery exceeds that of the current generated. This switch is simply constructed and the diagram sufficiently explains it.

When the starting pedal is depressed contact is made wtih the two bottom binding posts that form a connection between the positive and negative poles of the battery in such a manner that the cells are coup'ed in series and a voltage of 12 is obtained. As the engine begins firing and creates power the pedal is released and the switch automatically reaches a position where the battery cells are connected in two groups of three each, each group having a voltage of six, and the cells are charged with the current generated at this voltage.

The wiring for the lighting circuit is connected to the generator at the right binding post and led to a fuse block and coil on the inside of the dash. On this block are terminals for the wiring for the different lamp connections and provision is made so that the lamps may be burned dim or bright as occasion requires. The circuit is amply protected by a fuse.



Hair-Pins inserted thru Armature Laminations

The motor-generator armature is wound with coils of flat copper wire, formed to have the shape of a hairpin, which name is applied as describing them, and these are insulated by mica. The winding coils are installed in slots in the armature core and the ends of the coils are spot welded to the segments of the commutator. In the bore in the center of the core is placed the armature shaft, which is mounted on annular ball bearings. The complete armature is impregnated with Bakelite, which is subjected to a high temperature for a considerable period and it is then impervious to oil or moisture and perfectly insulated. The field frame of the motor-generator is a semi-steel casting to which the field coils are secured.

The commutator is at the forward end of the armature, and the armature is enclosed in the field frame by a hard rubber cover or plate on which are mounted the brushes. There are 12 brushes in all, equi-distant on the plate, 10 of which are metal graphite and two pure graphite, the latter being the lubricating brushes. The brush assembly is a "finger" type, there always being two brushes in contact, each of which is connected with a collector ring of opposite polarity.

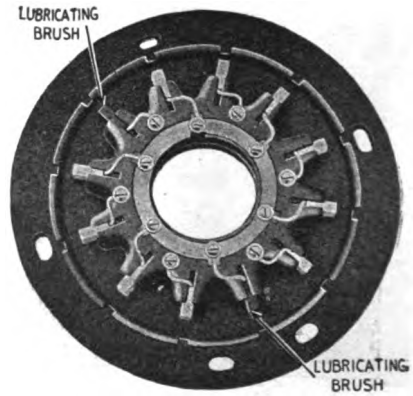
The regulator, which controls the voltage of the current charging the battery, is seated in an opening in the center of the hard rubber plate carrying the brushes, and it is a somewhat novel construction, the current being varied by the degree of tension upon a spring, this tension being established by turning a screw in the center of the regulator. This automatically controls the charging of the battery within the range of variability provided by the design and the setting of the spring tension.

Should there be occasion to start the car by cranking the engine, by loosening the lock nut and unscrewing it the regulator may be withdrawn from the plate in which it is mounted. A special fitting is provided for the engine crank, so that it may be engaged with the end of the armature shaft for turning the engine in the usual manner. It is said that no injury can be suffered when cranking the engine by hand. When the engine has been started the regular is replaced.

The unit is claimed to have unusual merit in that it can be easily and quickly installed without adapting the engine for it. Being directly connected, the action is positive, and there can be no variability because of chain or gear adjustment. The manufacturer states that when once installed there is practically no need of attention aside from lubricating the armature shaft at intervals, as the commutator is adequately lubricated by the soft graphite brushes.

Dayton starting, lighting and ignition systems are sold in New England by the V. A. Nielsen Co., 708 Beacon street, Boston.

The motor-dynamo is so constructed that the commutator does not gum and, therefore, needs no sanding, as no lubricating oil can reach it. It is recommended, however, that the front of the motor-dynamo be removed each season, and, when this is done, the brushes examined and the dust from the brush wiped out. For this a dry cloth should be used.



Commutator Brush Assembly

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OVERLANDS SCORE HIGH IN TESTS OF DEPENDABILITY.

A Boston-Springfield "Dependability Run" was recently conducted by the Connell & McKone Co., Boston distributor, using two Overland Model 90 stock cars. It was a seven-day motor non-stop test. The engine ran continually for 168 hours without missing an explosion. The total mileage was 3852.6. Eighty-seven gallons of gasoline were used, averaging 20.6 miles to the gallon. Oil consumption for the seven days and nights was 21 pints, or 367.3 miles to the quart. The actual running time was 157.5 hours, 68 hours of which were rainy. The speed per mile was 24.46 miles per hour. Tires were not changed. One car started from the City Hall in Boston, the other from Court Square, Springfield. The cars left each city thereafter every fourth hour.

Another remarkable endurance feat by an Overland 90 was performed in Harrisburg, Pa., when all previous records for daily mileage maintained for 5¼ days of the seven-day run, on a non-stop schedule in high gear, were broken by a stock touring car. The daily average was 702.5 miles, an average rate of 29.7 miles per hour. The mileage for the seven days and nights was 4503.6 miles. The run did not set a new high mark of a seven-day non-stop sealed in high gear run because an engine was stopped once by a break in the gasoline line. This occurred after the motor had run continuously five days and six hours, and happened on a muddy country road at night where no help was available. About six hours were lost repairing the leak, and then the car resumed its run, beating all recorded seven-day mileage records using only high gear. The course covered a radius of 60 miles around Harrisburg. Running conditions were difficult, including traffic obstacles, rough clay roads and hills, and heavy rains were encountered.

BREMER PERMANENTLY ENTERS FORD RADIATOR FIELD.

The Bremer Manufacturing Co., Chicago, has permanently entered the Ford radiator replacement field during the past year and has developed a replacement business in both fin tube (regular Ford type) and the honeycomb type. Sales Manager Ian E. Maltby reports that the war period left the company with no bad effects and that the Ford replacement department of the business will soon equal the company's special truck and tractor radiator business. The company for many years has been a heavy producer in the truck and tractor field.

ORDERS GODSOL FREE.

Federal court decrees releasing from custody Frank J. Godsol, arrested on charges of defrauding the French government out of $1,500,000 in the purchase of motor trucks, and whose extradition was sought by the government, in effect have been sustained by the United States Supreme Court.

Financial Personals and Gossip of the Automotive Industry

STUDEBAKER.

Reason enough for the strength in Studebaker common exists in the current earnings and production and in the volume or forward business, all of which are factors more potent marketwise than the $4 dividend.

It is understood that for the first quarter Studebaker's net earnings were about three times those of the first three months last year. For the first half year it is estimated that profits will more than double results for same period of 1918.

At this rate Studebaker can hardly help materially bettering the total of $3,884,000 net for 1918, which was equivalent to over $10 a share on the $30,000,000 common. The final quarter, for instance, last year, owing to the shift back to a peace basis, was distinctly disappointing as regards net, turning in less than $700,000. This year both the third and fourth quarters are bound to be big.

The demand for Studebaker cars is exciting much comment. As the company has stopped taking orders entirely it is hard to state exactly what the demand would be, but it is safe to say that 10,000 cars a month could be sold if they were available.

Production at the moment is averaging only 40% of this potential demand, or 4000 cars a month. Unshipped orders amount to 12,000 cars.

Work on the new plants is well under way with some units 50% completed. They should be available for production early next year.

A dispatch from South Bend quotes President Erskine as saying Studebaker Corporation's original plan for new plant expenditure this year of $4,250,000 has been revised and $8,500,000 will be expended.

KELSEY WHEEL.

The strength of Kelsey Wheel is predicated on knowledge that company is expanding its business. In addition to automobile wheels, Kelsey now makes automobile bodies and automobile brake bands. A total of 690,000 sets of wheels were manufactured last year and it is said output this year would be 800,000.

GET BIG PROFIT.

A neat profit has accrued to subscribers to the securities of the Cleveland Automobile Co., a new company sponsored by Hornblower & Weeks and the Chandler Motor interests for the manufacture of a low priced six-cylinder car. Its authorized capital consists of 14,000 shares of eight per cent. preferred stock, par 100, and 14,000 shares of common stock of no par value. The preferred stock was offered at par with a bonus of four shares of common for every 20 shares of preferred. The preferred stock is 85 bid and the bonus stock sells for $250 a share. Taking a loss of $300 on the preferred stock and applying it against the $1000 profit on the common, a subscriber to 20 shares of the preferred has a profit in a little over 60 days of $700, or 35%.

GRAY & DAVIS.

Gray & Davis having returned to a straight peace basis, is now an automobile proposition and should share in the prosperity which faces the motor industry. On account of the war approximately one-third of the company's business last year represented sales of self-starters and lighting systems, but in the current 12 months practically all its gross will be represented by these two lines.

FISHER BODY.

Fisher Body has made a new high record. While President Durant of General Motors stated recently that there was no basis for reports of merger involving General Motors and either Maxwell or Ford, he did not deny the most persistent of all reports which has been that General Motors interests were acquiring control of Fisher Body in the open market.

E-B ASKS LISTING.

Application has been made to the New York Stock Exchange by the Emerson-Brantingham Co. to list $12,170,500 of cumulative preferred and $10,132,500 of common stock.

NEVADA.

The Nevada State Automobile Association, a state-wide organization, designed to promote the interests of automobile owners, to encourage the development of good roads and under present plans destined to take an active part in the highway building program of the state, was permanently organized at a meeting in the Commercial Club in Reno.

George A. Campbell of Reno was elected president and R. L. Harley of Lovelock, secretary. Offices will be maintained in the Commercial Club rooms, where a touring bureau will be established and where all desired information for tourists and others will be supplied.

GMC PLACES ORDER FOR 345,000 TONS OF STEEL.

An order for 345,000 tons of steel has been placed with the United States Steel Corporation by the General Motors Corporation. This is one of the largest individual orders placed in the steel industry since the signing of the armistice, being nearly double in tonnage the order for steel rails placed by the railroad administration. For some time it has been asserted that the automobile industry was the heaviest consumer of steel. The present order is diversified through a number of steel products.

The Ford Motor Co. has placed an order for 150,000 tons.

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WILLS AND LEE GET SITE FOR FACTORY WHERE THEY PLAN TO BUILD NEW CAR

CHAROLD WILLS and John R. Lee, who several months ago severed their connection with the Ford Motor Co. and with Henry Ford, together with associates yet to be announced, have purchased or optioned a large tract of property on the St. Clair river between St. Clair and Port Huron, and about 50 miles from Detroit.

They plan to build a large plant upon this property to manufacture the motor car which Mr. Wills is now designing. The name of the car and the name of the company which they are organizing have not yet been decided upon.

Through this property will run the New Port Huron Southern Railroad of Handy Brothers, who will build railroad shops and a terminal to serve the industries of this new industrial community. This property in many ways is ideally suited for the large industrial development planned for it. It is very high and tests have revealed a solid clay foundation. It extends along the shores of the St. Clair river for several miles and lies on the highway of the Great Lakes commerce. There is navigable water everywhere close up to the shore.

Traffic Facilities.

For traffic facilities the new company will have the Rapid Railway, Detroit and Cleveland Steam Navigation Co.'s steamers, the White Star Line and Lake freighters. There are also the lines of the Grank Trunk and Pere Marquette, with direct line to Chicago, and the tunnel service to eastern points.

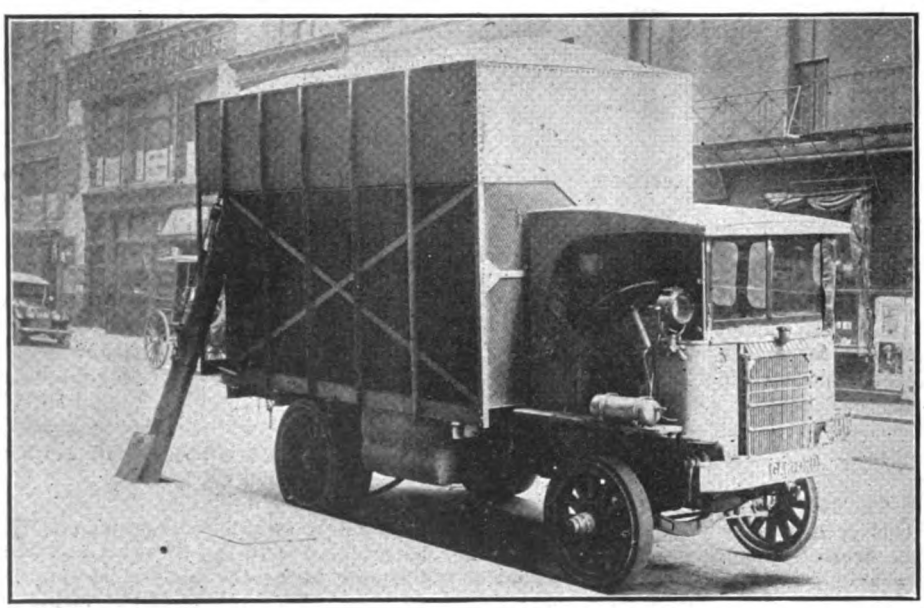
The new community too will be a radial center for general manufacturing in Flint, Lansing, Pontiac and other business centers of Michigan. It will also have the advantage of direct freight service from Toledo to southern points without transfer at Detroit or intermediate points. Also the proximity of the new industrial center to Port Huron with the latter's progressive Board of Commerce will be of substantial mutual advantage. Mr. Wills said:

Big Future for District.

"We have been asked why we hit upon Port Huron and the St. Clair river for our manufacturing site. You can best answer that by looking at the map. In our judgment it offers the best combination of the essentials of a successful industrial center that can be found anywhere in this part of the country. It won't be long before the St. Clair river is lined with smoke stacks. We're so confident of this that we are ready to cooperate with any manufacturing enterprises that are interested in locating advantageously. We feel that the St. Clair river district has a big future."

Mr. Wills was asked how he and his associates plan to utilize such a large tract—approximately 2000 acres. He said: "Well, we want to grow—that is about all. We have plans, development of which requires plenty of property.

Removal of Ashes by Suction from Basement



Truck Equipped for Removal of Ashes from Pits by Suction of Power Blower, Built for Ash Removal, Inc., New York City, by the Garford Motor Truck Co.

An apparatus has been delivered to Ash Removal, Inc., New York City, a concern that specializes cleaning ash pits of buildings and residences that, while in a sense experimental, will, the designers believe, be extremely practical and economical, and meet with the approval of property owners, residents and citizens generally.

The equipment is mounted on a Garford five-ton chassis and is a large box compartment, resembling the conventional van, the doors and gates of which can be closed tightly. On the chassis is mounted a blower that is driven by the engine, and this is so adapted that ashes are drawn into the compartment from the ash pit, no matter what the angle, through a telescoping metal tube. The truck is driven to the curb at the nearest point to the ash pit and the tube is extended into it. The ashes must be shoveled to the lower end of the tube and the suction carries them into the compartment on the truck.

The labor is limited to shoveling in the ash pit, or at least handling so they can be drawn out by the blower, and there is no dust blown about outside. The time of loading the truck is much more rapid than would be possible were the work done manually, and this is of material importance when the time of trucks is considered as representing a substantial value. The prevention of dust will be approved by all sanitary departments of municipalities. Statement is made that the work of the apparatus is so satisfactory that there is reason to believe adoption will be general, both for municipal service and for contractors.

(Continued from Page 8.)

INDIANAPOLIS RACE.

Bandini, one of the unfortunate victims of the race, lived in Los Angeles, Cal., and it is said he was the heir to a large fortune. Clifford Durant, son of the president of General Motors and probably the most conspicuous figure today in the automobile manufacturing world, had hard luck when the race was half over and retired. His father is very much opposed to the young man's determination to win a big race and was not a bit displeased when he learned that his boy had been stopped by mechanical trouble.

Durant's Hard Luck.

Young Durant conducts the Chevrolet interests of his father on the Pacific coast and comes East only to race. He has made several good attempts to capture a big event. Misfortune has usually overtaken him, according to his way of thinking, but his father regards his past performances as lucky, because he thinks if the boy ever won a really big race he would never be willing to do anything else.

Young Durant, however, is not discouraged and he is confident that some day he will win a big race.

Bandini Millionaire.

Louis Lecocq, who was burned to death with his mechanician. Robert Bandini, when their car caught fire, was born in Des Moines, Ia., 26 years ago and began automobile racing in Elgin, Ill., in 1914.

The car he was driving in the Ascot Park race in Los Angeles, March 17, 1918, overturned and he was slightly injured, and he had several other narrow escapes from death. Lecocq took third place in the 1919 Santa Monica road race.

Bandini was born in Los Angeles 21 years ago and began racing March 17, 1918, acting as mechanician for Brent Harding. Later he was mechanician for Roscoe Sarles. Several years ago he inherited one-sixth of the $7,000,000 estate of his grandmother, Mrs. Arcadia B. De Baker, a member of a noted California family.

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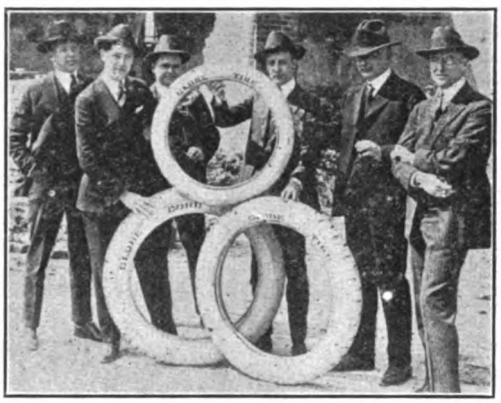
TIRE INDUSTRY AND TRADE

The Globe Rubber Tire Manufacturing Co. has appointed Hawley, King & Co., California distributor for Oakland automobiles, as distributor for Globe tires in California, Arizona and Nevada. Hawley, King & Co. has been established in Los Angeles for 32 years and is one of the oldest motor car dealers in the city. It is the first exclusive automobile distributor in southern California to enter the equipment field. Reeve Gartzmann, general manager, heads the tire department, with H. A. Anderson as sales manager. Dealers will be installed in every city and town in the territory. The Globe company has been producing pneumatic tires for eight years and is now turning out 1500 daily. J. B. Linard, said to be the youngest man in the country in a similar capacity, is president. Dr. H. W. Kugler, formerly chief chemist for the Firestone company, is general factory manager. H. L. McGregory, formerly efficiency expert for Firestone, is assistant factory manager, and R. E. Glass is auditor. One of the distinctions claimed for the Globe tire is that it is single cured.

The Braender Rubber and Tire Co., Rutherford, N. J., in announcing revision of prices, states: "During the revision of prices we have taken into consideration the position of the consumer when purchasing a first class piece of merchandise, the dealer who handles same and the jobber who in turn sells to the dealer. To both the jobber and the dealer we have arranged a far more satisfactory proposition than heretofore and to the consumer we are offering a high grade piece of merchandise the same as in the past at a slightly higher list with a longer mileage guarantee or basis of adjustment. We feel that a higher mileage adjustment basis will be more attractive when purchasing Braender tires."

The B. F. Goodrich Rubber Co.'s athletes triumphed over the Goodyear, Firestone and Miller track men in the track and field meet held in Akron, O., Memorial Day. Factory teams of the city competed. The score was: Goodrich, 59; Goodyear, 45; Firestone, 40; Miller, 9.

The B. F. Goodrich Rubber Co. has notified the New York Stock Exchange of the proposed increase in capital stock from $84,600,000 to $109,600,000 by the issuance of $25,000,000 preferred stock.



Globe Tire Sales Organization of Hawley, King & Co., Distributor for California, Nevada and Arizona. At Extreme Right Is Reeve Gartsmann, General Manager; Next to Him Is A. T. Smith, Globe Factory Representative in the West.

The Coffield Tire Protector Co., 39 Cortland street, New York, is exhibiting at its salesrooms a tube and tire protector, which is said to reduce punctures and prolong the life of both tire and tube. The protector consists of an inner lining ring, made of rubber, which is placed between the casing and the tube. This ring, it is said, will deflect nails and sharp objects. The device also is said to allow 10 to 15 pounds lower inflation, which makes for an easier riding car.

The Fomento de Comerico Internacional, S. A. (International Commerce Exchange), which has a new rubber factory under construction in Mexico City, has begun the manufacture of automobile tires and inner tubes. It is a private enterprise, with an investment of about $350,000. The factory has American machinery and employs 100 hands. When running at full capacity the company will employ 350. Rubber goods of every description are to be manufactured eventually. There is another small rubber factory in Mexico City which is prepared to manufacture rubber tires, but which is not producing at present.

The Polson Rubber Co., Cleveland, manufacturer of tire accessories, is preparing to build a large modern factory to take care of its increasing business.

The Goodyear Tire and Rubber Co. publishes a factory newspaper three times a week. This paper is called "The Wingfoot Clan," and carries official notices and bulletins, explanations of factory policies and general news of the factory and has a special sport page, covering all Goodyear athletic activities. Through the medium of this paper the entire factory labor force can be reached on a day's notice. This paper was a powerful factor in putting over the Goodyear quota of the Victory Loan, more than $2,000,000 having been subscribed in three days.

The Savold Tire Co. originally contemplated operating its own plants in New York City and selling county rights in other parts of the state, but a plan has been devised whereby the company will operate its own tire reconstruction plants in principal centers throughout the state, thus giving the company a much larger earning power than if it sold the territory for cash plus a royalty.

The Fisk Rubber Co. newspaper, the Fisk Bulletin, pays a fine tribute to William T. Whitlock, who has left the company's plant at Chicopee Falls, Mass., after 15 years' service. Before going to Fisk he was with the G. & J. Tire Co., Indianapolis, where he progressed through the various grades from foreman to superintendent. He entered the Fisk plant as assistant superintendent to G. A. Ludington. Whitlock is one of the pioneers in the tire business, having started in the days of single tube tires. He plans to take a vacation of several months.

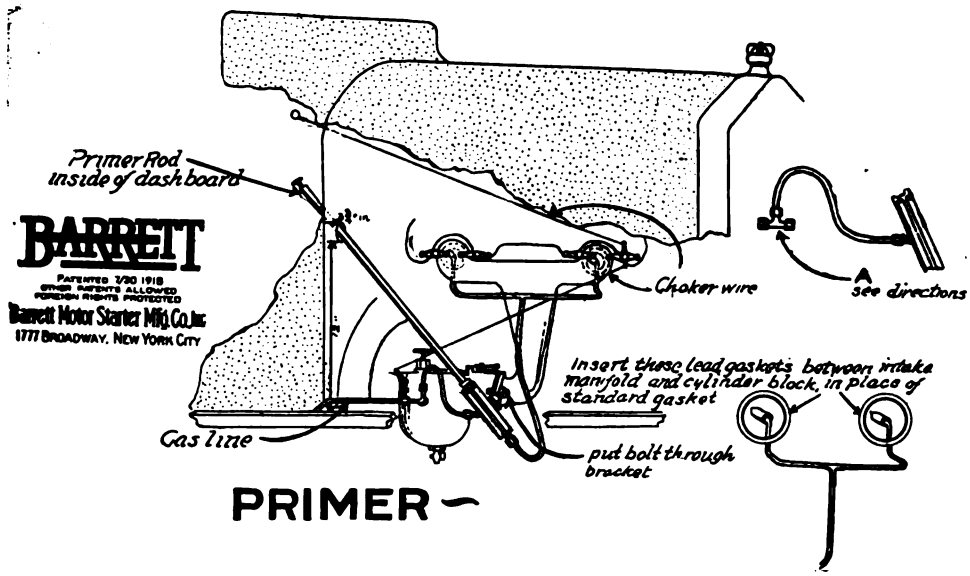
The B. F. Goodrich Rubber Co. announces that it has raised the mileage guarantee on its fabric tires to 6000 miles and to 8000 miles on its Silvertown cord tires.

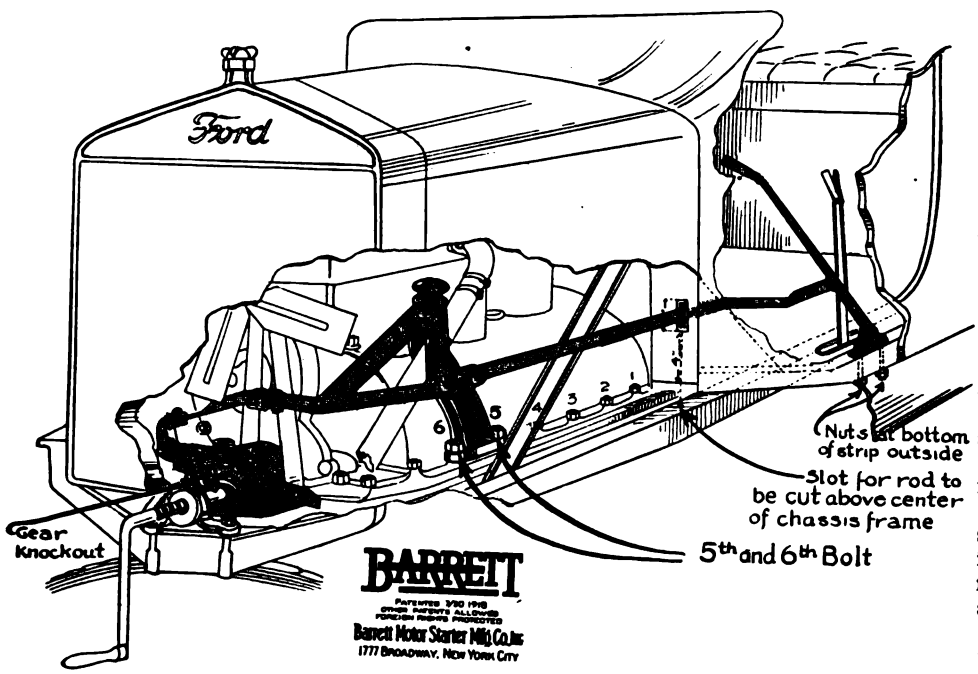
The Keystone Tire and Rubber Co. has opened a $50,000 branch corporation in Portland, Ore. This will be a distributing point for Keystone and Batavia tires and also 21 makes of "tire seconds," which are now distributed by this company. The Keystone company plans to have 200 stores in operation before the end of the year.

The Fisk Rubber Co.'s offering of $15,000,000 seven per cent. first preferred stock has been sold through the Estabrook & Co. syndicate.

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Barrett Motor Starter for Ford Passenger Cars and Trucks Very Effective





BROAD claims for efficiency are made for the Barrett starter, designed for use with the engines of Ford cars and trucks. The unit is built by the Barrett Motor Starter Mfg. Co., Inc., 1777-9 Broadway, New York City.

The Barrett starter is simply constructed and may be attached to any Ford car chassis in a few hours time by anyone handy with tools. Once installed it will last indefinitely the manufacturer claims, as it is made from the best of materials, and it has been proven absolutely reliable.

It is attached to the crankshaft at the front of the engine by two gears, one of which is fastened to the crankshaft by a pin, the other operating as a ratchet. In case of backfire this gear is automatically released so the gear on the crankshaft may turn without damage to the starter.

The starter is operated by a hand lever located near the emergency brake, connected by suitable linkage to the starter head, and swings the starter into upright position, giving the engine a turn that will cause firing. This motion may be repeated as often as desired till the engine is operating under its own power.

For starting there is a priming device on the dash that operates a small pump fastened to the carburetor and connected with the gasoline feed pipe by a short copper tube. From the pump a copper tube leads to the inlet manifold, which is divided into two branches, one branch entering the left elbow and the other entering the right, through which gas may be injected into the inlet manifold to facilitate starting the engine.

Claim is made by the manufacturer of the Barrett starter that it will start a Ford engine in the coldest weather with minimum effort. It is claimed to be practically trouble proof and requires little attention after once installed.

Lubrication is provided by a device that is filled with oil every 5000 miles. The starter is guaranteed for five years. It is light, the complete outfit weighing but 10 pounds.

The price for the starter and primer complete is $25.

WOMAN IS CHOSEN AS VICE PRESIDENT OF A. A. A.

At the annual meeting of the American Automobile Association in Washington, the directors, recognizing the wider field of activity being assumed by women, elected as one of the vice presidents Mrs. Robert Lee Morrell of New York City. David Jameson was re-elected president for another year. The other vice presidents chosen were: Ralph W. Smith of Colorado, P. J. Walker of California, H. J. Clark of Minnesota, Clifford Ireland of Illinois, Dr. John H. Quayle of Ohio and Dr. R. R. Elmore of Kentucky. H. A. Bonnell of New Jersey continues as treasurer, John N. Brooks of Connecticut as secretary and A. G. Batchelder as executive chairman.

WANT FRENCH BAN LIFTED.

An effort is being made to have France lift the ban on the importation of American automobiles. France placed the embargo when a large munitions plant employing 20,000 hands was changed into an automobile plant. It will build a low price car to replace the Ford and cars of foreign make.

BROWN SPRING OILER DRIVES AWAY ALL SQUEAKS.

Wherever lubrication is needed in an automobile, provision has been made for supplying oil or grease except in the springs. Though a car be traveling over ideal roads the spring is never idle—not even for a moment.

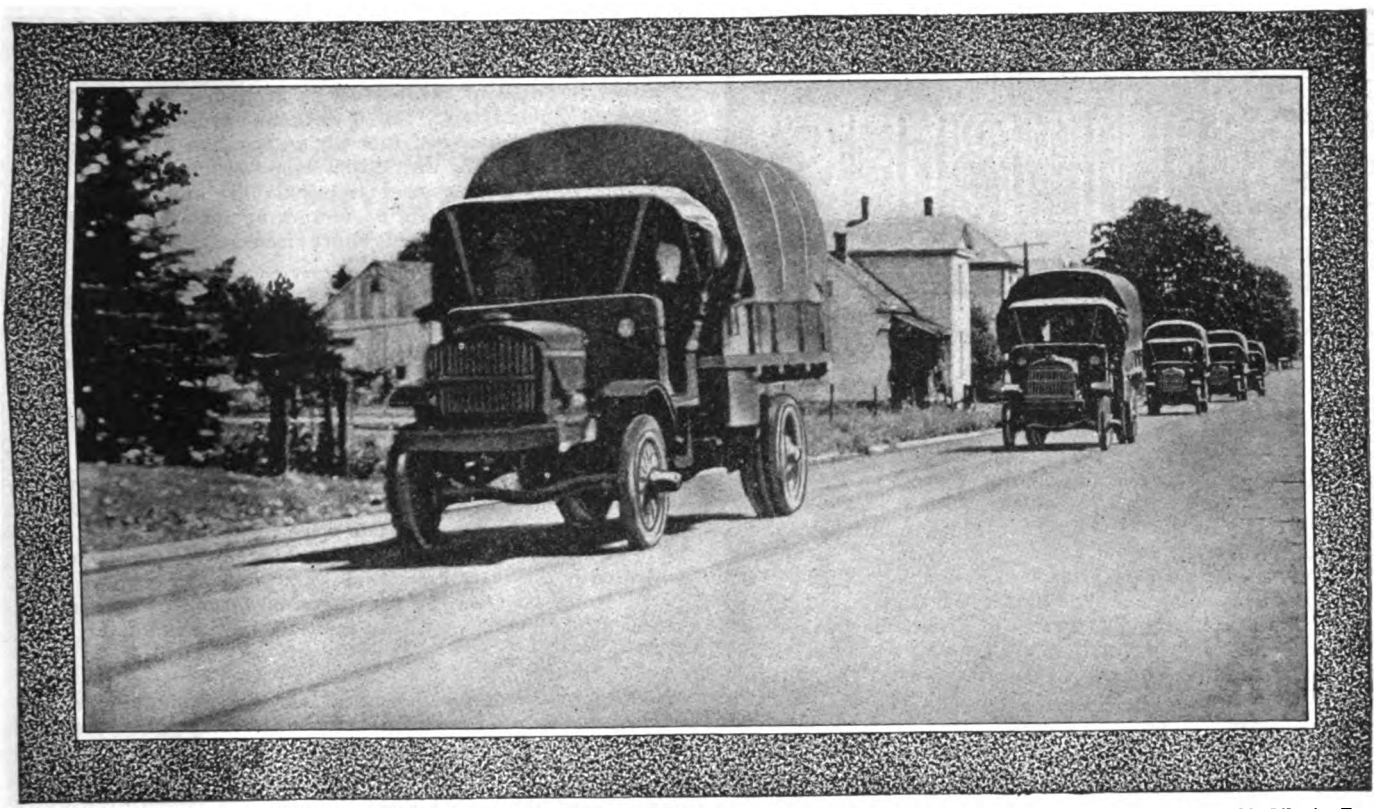
The Brown Spring Oiler makes oiling springs an easy matter, and it shoots oil into crevices where none could get before. It increases the comfort of riding and tends to prevent spring breakage.

The Brown Spring Oiler is manufactured by the Brown Spring Oiler Co., 6911 Carnegie avenue, Cleveland, O. It is guaranteed to keep springs free from rust and squeaks on one condition, which is, that the user do his part and supply thin oil. Units are made in widths of 1½, 1¾, 2, 2¼, 2½, 2¾ and three inches to fit the different widths of springs. Standard depths are 1¼, 1½, 1¾, 2, 2½ and 3 inches.

BROWN SPRING OILER.



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Vanguard of fleet of 88 Liberty Trucks passing through Oakville, Delaware County, Ind., in August, 1918, over Tarvia Road built in 1916. Note perfect condition of road after two years of hard service.

Every Community should have roads like these—

HERE is the story of how Delaware County, Indiana, got good roads, as told by the County Surveyor. Everyone interested in good roads should read it.

"Our first Tarvia road was built in 1914. Between 1914 and 1918 we constructed sixteen streets and roads, with a total area of about 2,880,000 square feet.

"Some of these are main streets in the city of Muncie, others are main roads subject to heavy traffic, while others replaced low-lying gravel roads that used to wash-out at every overflow of the river.

"*Every Tarvia road and street in Delaware County has given uniform satisfaction. No repairs have been necessary.*

"Our so-called 'hard' roads, built of brick or concrete are often claimed as permanent construction, but we have in this county brick roads and streets built less than a decade ago that are almost impassable and must soon be rebuilt. New material will be required because the old brick cannot be used again.

On the other hand, when a Tarvia road wears, a little stone is added, Tarvia is applied, and the road is as good as, or better than, new.

With proper maintenance, our Tarvia roads will last ten to twenty years. The cost of maintenance will be small and the entire road can be rebuilt at less than half the cost of a brick pavement.

"Considering the various types of road from a purely financial standpoint, one does not need to be skilled in higher mathematics to arrive at the correct answer."
(Signed) S. Horace Weber,
County Surveyor

Tarvia is a coal-tar preparation for use in constructing new macadam roads or repairing old ones. It reinforces the road surface and makes it not only mudless and dustless, but also water-proof, frost-proof and automobile-proof. A few Tarvia Roads in any community will add to property values and reduce taxes.

Illustrated Tarvia Booklet free on request

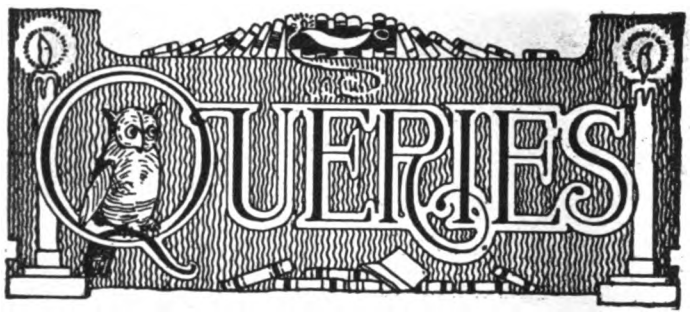
Tarvia

Preserves Roads—Prevents Dust

This company has a corps of trained engineers and chemists who have given years of study to modern road problems. The advice of these men may be had for the asking by any one interested. If you will write to the nearest office regarding road problems and conditions in your vicinity, the matter will have prompt attention.

THE BARRETT COMPANY, Limited: New York, Cleveland, Birmingham, Seattle, Youngstown, Chicago, Cincinnati, Kansas City, Peoria, Toledo, Montreal, Philadelphia, Pittsburgh, Minneapolis, Atlanta, Columbus, Toronto, The Barrett Company, Duluth, Richmond, Winnipeg, Milwaukee, Latrobe, Vancouver, Dallas, Bangor, Bethlehem, St. John, N.B., Boston, Detroit, Nashville, Washington, Elizabeth, St. Louis, New Orleans, Salt Lake City, Johnstown, Buffalo, Halifax, N.S., Baltimore, Lebanon, Sydney, N.S.

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TO CONNECT A BATTERY IN CIRCUIT WITH HIGH-TENSION MAGNETO.

(A. E., New York City.)

Please tell me if it is possible to connect a battery in circuit with a high-tension Bosch magneto and if so how it may be done? Please show wiring diagram?

In your inquiry you state that you use a Bosch magneto, which is necessarily high-tension The most satisfactory installation for using a battery system with this magneto is the dual system of connecting the battery through a coil on the dash. This usually takes the form of a switch. In the early days of high-tension magnetos this system was used almost entirely by the manufacturers of automobiles. They did not at that time have the confidence in high-tension magnetos they now have. Today, in automobile and truck construction the high-tension magneto is used almost exclusively without a separate battery circuit. However, if you wish to make use of a battery in connection with a Bosch high-tension magneto, wire the circuits according to the following diagram, using a coil and a switch in the dash.

It will be noted that while the independent magneto requires but one switch wire in addition to the cables between the distributor and spark plugs, the dual system requires four connections between the magneto and the switch; two of these are high-tension and consist of wire No. 3 by which the high-tension current from the magneto is led to the switch contact, and wire No. 4 by which the high-tension current from either magneto or coil goes to the distributor. Wire No. 1 is low-tension, and conducts the battery current from the primary winding of the coil to the battery interrupter. Low tension wire No. 2 is the grounding wire by which the primary circuit of the magneto is grounded when the switch is thrown off or to the battery position. Wire No. 5 leads from the negative terminal of the battery to the coil, and the positive terminal of the battery is grounded by wire No. 7. A second ground wire, No. 6, is connected to the coil terminal. The simplicity of this wiring requires little comment.

It is advisable to use Bosch loop terminals for all connections for which special terminals are not provided, as these present a maximum protection against the straying of wire strands and consequent short circuits.

THE DIFFERENTIAL; ITS PURPOSE AND PRINCIPLE.

(W. V. S.—Waterbury, Conn.)

Kindly tell me through the columns of the Automobile Journal the following:

1. In going round a corner, where does most of the power go; the rear wheel nearest the curb or the outer wheel, with car turning to the right?

2. In pushing a car from the back, near the right wheel, with the front wheels turned to the right, the car pushes harder than if the front wheels were turned to the left. Why is this? Is there such a thing as the power going to the wheel with the least resistance in turning a corner?

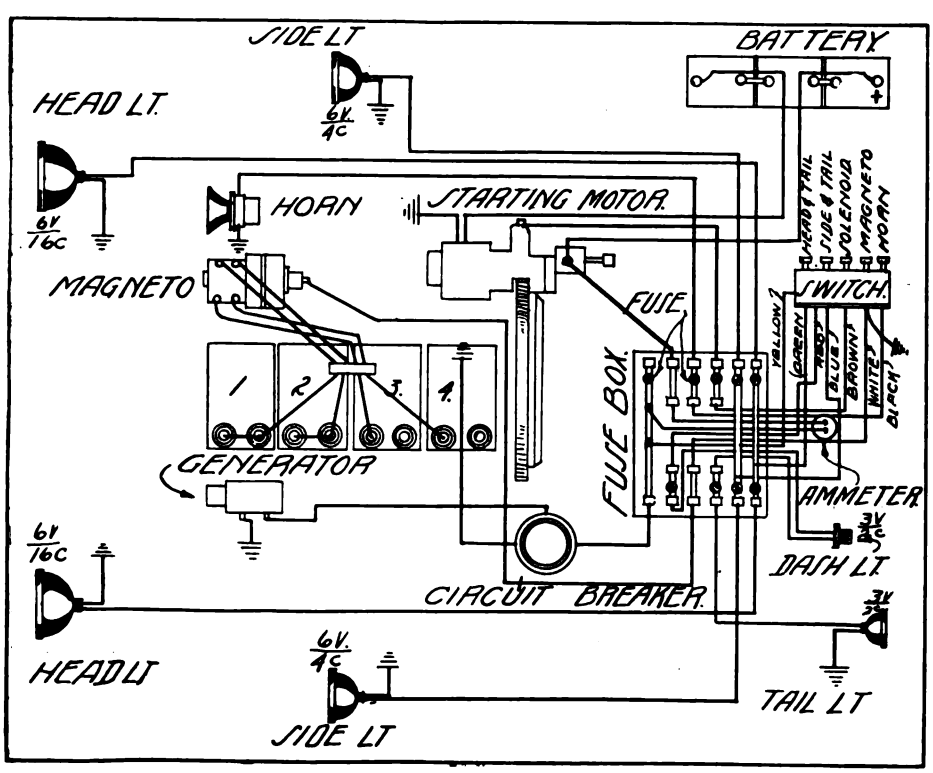
3. How many wires are there in the entire car of the model 83 Overland, including ignition, lights, ammeter, horn, etc.?

The purpose of the differential is to provide the automobile with a compensating gear or differential, that the rear wheels may revolve at different speeds when the car turns a corner, while at the same time both are being driven by the engine. This gear is automatic and operates according to the resistance of the road against the wheels.

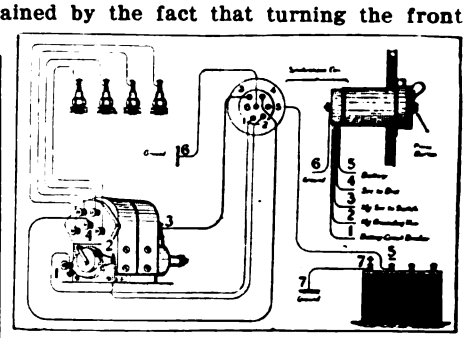
Principle: There is more resistance to the turning of the inside wheel than to the outside wheel, and, consequently, the latter may revolve faster. It is necessary for the outside wheel to revolve faster, because it has a longer distance to travel than the inside wheel. See Fig. 2 and note that if the car is turning to the right the wheel "A" must revolve faster than wheel "B." Therefore, we must "compensate" for this difference.

1. This will explain where most of the power goes and shows that it goes to the inside wheel, or the one that has the shortest distance to travel.

2. This is explained by the fact that turning the front



Wiring Diagram Used on 1915 Overland Cars, Using High-Tension Magneto for Ignition Generator and Storage Battery for Starting and Lighting and Horn.



WIRING DIAGRAM OF THE DUAL SYSTEM

Bosch Magneto and Battery.

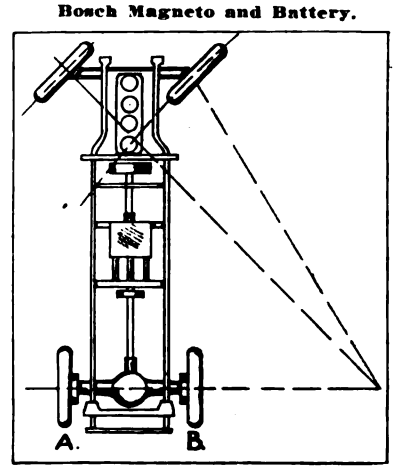


Fig. 2—Differential.

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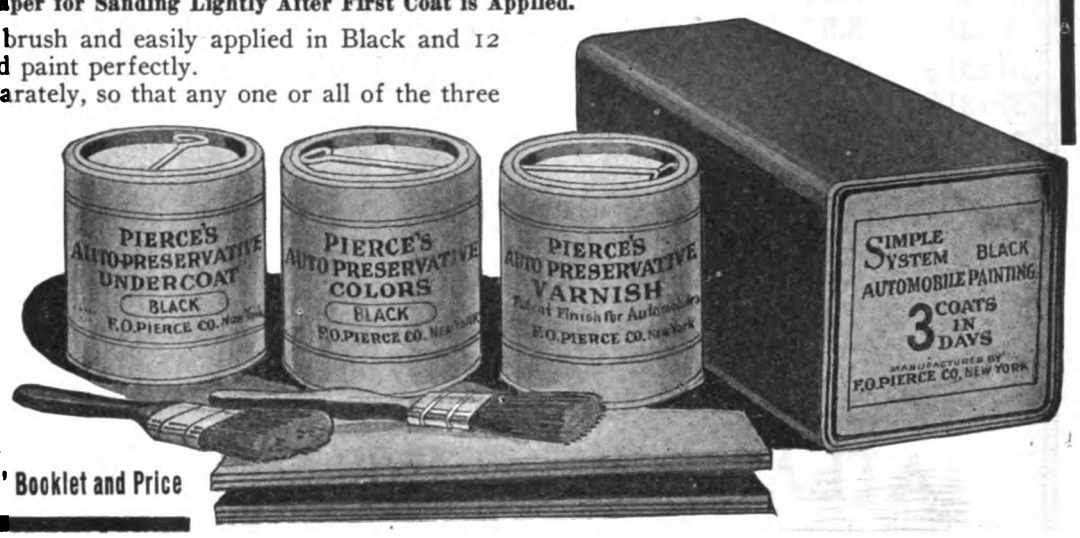
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wheels to the right, and pushing the car from the rear right corner, more effort is required to move the car than if it were pushed from the left rear corner. The most resistance is met with at the right corner. You have not only the resistance of the front wheel, but resistance of rear wheel.

The power goes to the wheels equally under normal conditions, but in turning a corner the outside wheel receives the most of the power, as it has the longer distance to go and it is certainly true that the power goes to the wheel that offers the least resistance.

3. The 1915 Overland cars use the Auto-Lite system, which is shown in Fig. 1. This is a six-volt, three-unit system, operating on the one wire principle. The ignition function is performed by an entirely distinct appliance from the starting and lighting systems, namely, a high-tension magneto. Five wires run from this magneto, four to the spark plugs and one for interrupting the ignition through a fuse box to the controlling switch. The generator is driven from the motor crankshaft by a silent chain. The starting motor, which has the switch mounted integrally, turns the engine crankshaft through a gear cut on the flywheel rim. One of the wires of the generator is grounded, the remaining wire leading from that device runs through the circuit breaker and from that member through the fuse box and switch to the storage battery. Two wires run from the six-volt battery, one of these terminating on a switch terminal of the starting motor, while the other attaches to one of the motor terminals. The remaining motor terminal is grounded. The various appliances are clearly shown, and the wiring may be easily traced from the various units through the fuse box and switch by careful study of the diagram, Fig. 3. In order to simplify wiring the wires going to the switch are all colored differently. This insures that they will be replaced on the proper terminals if removed.

The storage battery used with this system is of a special form, in which the three cells are placed end to end instead of side by side, making a long, narrow battery instead of the usual construction, which is approximately square.

A study of the wiring diagram will give one an idea of the number of wires that go to make up the system. There are nine circuits and 10 grounds in this system.

AMMETER DOES NOT REGISTER CORRECTLY.

(M. K. M., McAdoo, Pa.)

Have been having trouble with the ammeter on my 1917 Dodge car not registering the charge. Have had new brushes put in and a new starting switch installed. It will register charge when the car is running at about 25 miles per hour, but above that speed it will show a discharge. The indicator has been taken apart and found to be in first class condition.

Probably the trouble is in your new brushes. These were probably stock brushes such as can be bought from any supply house. The repair man possibly did not take the care that he should in fitting them, and probably instead of fitting squarely on the face of the commutator they simply touch the commutator on the edges of the brushes. Would advise that you remove the cover over the brushes, slip one of the four brushes out of its holder and notice if this is not the case. Wear may be shown on the edge only, instead of clear across the face of the brush. If you find that this is the case the brushes should be shaped to the commutator with a piece of sandpaper or a fine cutting file, care being taken not to put too much pressure on the file or sandpaper and not to remove too much of the brush, if it is made of carbon. If made of brass or copper wire more pressure can be applied. Square the brushes so that they will fit the commutator evenly and your trouble will cease.

If after the brushes have been properly fitted the trouble continues, look to see if the indicator connections are tight. The fact that you have had this loosened for examining may result in fault developing if they are not properly tightened. It might be well to try another indicator of the same type, to check the one that you now have. This can be done by installing the second indicator in place of the first for a short time. This will determine whether the first indicator is correct or not. To go a step further, if the fault is not found up to this point, it may be caused by a short circuit somewhere in the wiring, and would advise you to take the car to the nearest Dodge service station and have it inspected.

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34x3½	10.45	11.30	2.80
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KNOCKING MOTOR.

(N. N., Brockton, Mass.)

Please advise me how to stop my 1916 Overland engine from knocking when going up a hill. I have put in new rings and have a new carburetor installed. The bearings have all been taken up, the carbon removed and the valves ground. When running on the level the car runs well, going at about 10 miles per hour. It will not pick up and starts to knock when I feed it gas.

The writer remembers a similar case several years ago with a car of the same make. The cause was traced and further recurrence prevented by removing the cylinder block and fitting a new gasket under the cylinders. This gasket was about ⅜ of an inch thick and raised the cylinders and increased the areas of the combustion chambers, probably lengthening them ¼ inch. This reduced the compression somewhat and stopped the knock. Still another method employed was to put in a lower gear ratio in the rear axle. The car was geared 3½ to 1, and was changed to 4 to 1. This was just low enough to stop the knocking and also made the motor turn over faster, thereby preventing the knock.

The fact that your car will not accelerate readily is probably due to a faulty setting of the new carburetor. Your repair man should be able to adjust this for you.

HARD TO START FORD.

(S. L. M., Rockport, L. I.)

I have a Ford car that is hard to start. I have been told that it would start quicker on batteries. Will you kindly tell me how to wire it and how many batteries to use? Do you think that this will help?

A much easier start can be made with batteries, especially in cold weather. The spark lever on the wheel must be fully retarded for this, however, as a much hotter spark is given by the batteries than the magneto, and the danger of getting a kick is also greater. A terminal is left on the regular Ford coil box for connecting a set of batteries and this terminal will be found on the back of the dash in the bottom row of porcelain insulators that pass through the dash.

There are three rows of porcelain plugs here. The upper row carry the four timer wires, the next row lower down the four high-tension wires going to the plugs, and of the two porcelains at the bottom, the one on the right is connected to the magneto, while the terminal at the left is free from any connection. This is the terminal to which the wire coming from the carbon or positive pole of the battery should be connected. The other wire may be connected to any part of the frame or transmission cover where a permanent connection can be obtained. Four cells of dry battery, connected in series will be about right for this.

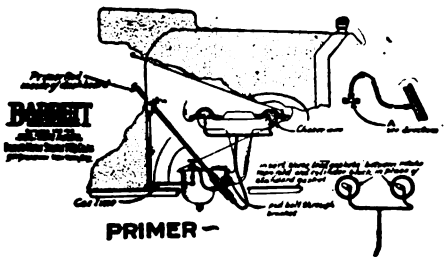
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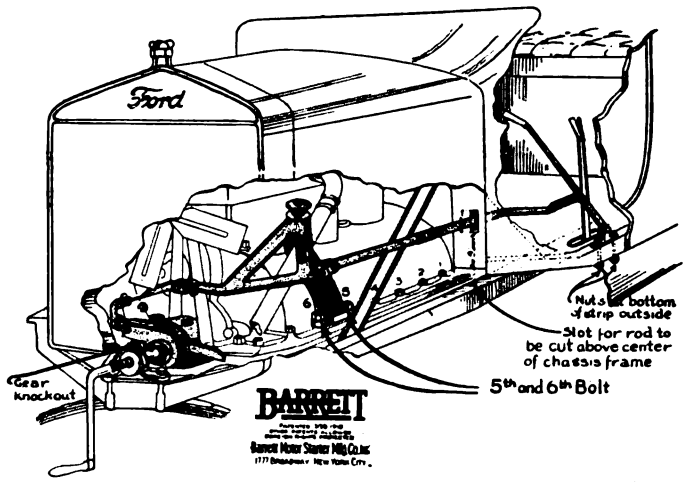
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CANNOT KEEP BATTERY CHARGED.

(L. T. B., Boston, Mass.)

I am using an Exide battery, six volts, for ignition and lighting only, connected with Auto-Lite generator. Battery is one year old and has just been thoroughly overhauled by a regular Exide service station. When running, my ammeter shows six to eight amperes charge. If running fast up to 10 amperes, with all lights on. Engine running idle, car stationary, the ammeter needle stays at 0, showing neither charge or discharge, but I cannot keep the battery up to its charge. Have reduced my headlights one-half their candle power, but it makes no difference. When the battery was new had good lights all of the time and no trouble. The Exide man claims that the battery is all right and in A-1 condition. Where shall I look for my trouble? Have had the battery recharged three times in three months.

Should certainly say from the description of your troubles that a short circuit was the cause of it all. The fact that your ammeter stands at 0 when the motor is running idle and does not show some slight discharge indicates that the ammeter indication is faulty, but how much is hard to say without checking it. Try another ammeter of the same type in its place under the same conditions. This will check the one you have been using and will prove whether it is correct or not. Should say that your generator was charging perfectly, otherwise you would not get the readings on the ammeter that you do. You can easily clean the commutator of the generator by removing the cover over it and using a piece of fine sand paper brighten the commutator. The brushes can be examined at the same time and smoothed up with a piece of sand paper drawn back and forth under them, sand side next to the brush. Blow out all the particles of sand and dirt before closing the cover. If the brushes are worn badly, better put in new ones. If the trouble still continues look to the circuit breaker on the back of the dash; occasionally the points of the breaker will stick, short circuiting the battery. Possibly the coil may be burned out. In this case it should be taken off and a new one put in its place.

WANTS TO PREVENT CARBON DEPOSITS.

(A. H. M., Philadelphia, Pa.)

We have a car in which considerable carbon trouble develops. We use good oil and a lean mixture. We clean the carbon out after running about 500 miles and now the carbon knock has developed again. Would injecting water into the manifold help to eliminate this? What grade of oil should be used?

Practically every car owner is complaining about the carbon in his engine cylinders. The cost is from 35 to 60 cents a cylinder to have it burned out, and within 30 days the knock is as bad as ever. Many owners go to the expense of having the carbon scraped out, and then the motor soon becomes carbonized. The trouble seems to be more common this year than ever before.

As the carbon forms so rapidly, think how it gets there, and then perhaps the source of the trouble may be eliminated. Carbon forms because all the fuel is not burned, and also on account of a portion of the lubricating oil breaking down. To relieve carbon trouble as far as possible, remove the cause. First, try a lean mixture; that is, increase the air supply. Then reduce the amount of lubricating oil.

To do this, experiment carefully to get the right amount, then add oil in small quantities, but rather often. Try this plan after you have had your motor cleared and it is doubtful if you will need to have the motor cleaned more often than once a year.

Water might give some relief, introducing it into the manifold from some outside source, such as from the radiator or from a small tank, having a petcock under the tank at the top end of feed pipe, so as to shut off this water when it is not needed. Wind this feed pipe several times around the exhaust pipe before allowing it to be fastened to the intake manifold. This method will turn the water into steam. This

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will do far more towards removing carbon than by introducing the water alone. A device of this kind is inexpensive and is easily made at home. Of course judgment must be used not to use too much water.

During cold weather a light grade of oil should be used; in warm weather a heavier grade is much more satisfactory. Always use the best grade oil obtainable and your engine troubles will be negligible.

INSTALLING HUMIDIFIER TO ENGINE.

(J. S. B., Westfield, Mass.)

The question of keeping down carbon is a vital one and from what I have read should judge that the water or steam method is the best. What is your opinion? Please advise me of the best method of applying the above idea to a Dort motor, giving instructions and diagram if possible.

Water is supplied to engines of several kerosene burning farm tractors in practically the same manner as the fuel, these being equipped with differing forms of devices or systems. When kerosene is the fuel water will promote combustion because the mixture becomes homogeneous, so that it burns more uniformly when ignited. It will prevent preignition, which results when the engine becomes highly heated, when extreme pressure and temperature will "crack" or break up the chemical combinations of carbon and hydrogen which reunite in the form of simpler gasolines that are more volatile and ignite before the ignition spark is created, or at the time at which the heavier fuel, had it not been broken up, would have ignited. Water keeps the carbon disintegrated—prevents it being deposited—to such an extent that it may be exhausted.

Engineers investigating the use of heavier engine fuels have found that water should be injected into the engine cylinders in whatever proportion was necessary to prevent "pounding," which was evidence of preignition, and that the volume required was variable with conditions. Many kerosene burning farm tractors are equipped with well developed water injection systems.

The gasoline now supplied generally contains a greater proportion of heavier oil and is not so volatile. When burned it creates more heat. It will not afford the quick response and flexibility of action that is possible with high grade fuel. The use of water is hardly necessary to promote combustion, and there is little probability of chemical preignition, so the main advantage would be keeping the cylinders more free from carbon, which is really the result of imperfect combustion. By this is meant that generally more fuel is supplied than can be consumed. The engine should be driven with the spark as far advanced as is possible, with the least fuel that will afford the necessary power, varying the fuel, but not the spark position unless the engine "knocks."

A number of concerns produce equipment designed to supply water to the engine—the one drawing water from the radiator and the other type being supplied by auxiliary tanks. One type carries humidified air to the intake manifold, these being actuated by the suction of the engine. Another type uses a special manifold that replaces the intake manifold, the water being drawn from the radiator and being converted into steam that is carried to the intake manifold. Another type is in effect a water tube that passed through the exhaust manifold, which heats the water and creates steam, which is similarly carried into the intake manifold. The water may be taken from the radiating system and admitted through a diaphram control valve, which regulates the volume of water supplied to the engine.

With reference to which of these might serve you, recommendation cannot well be made. Much depends upon the requirements and the cost. Some are well recommended and are claimed to be very satisfactory.

Some manufacturers of such equipment are: Atlas Auto Specialties Co., 212 Broadway, New York, N. Y.; Automobile Appliance Co., Drexel building, Philadelphia, Pa.; Comfort Motor Machine Co., 1719 Calapago street, Denver, Col.; Cox Brass Manufacturing Co., North Pearl and Van Woert streets, Albany, N. Y.; Esta Co., 103-7 Massachusetts avenue, Boston, Mass.; Friestedt Manufacturing Co., 2034-8 West Lake street,

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Chicago, Ill.; Gasoline Economy Co., Colonial Trust. Building, Philadelphia, Pa.; Hastings Manufacturing Co., Hastings, Mich.; Miller Gas Saver Co., 909 Third avenue, S., Minneapolis, Minn.; Motors Supply Co., Adam Arcade building, Joliet, Ill.; Redee Manufacturing Corporation, 1415 Hennepin avenue, Minneapolis, Minn.; S. & H. Manufacturing Co., 406 Palace Building, Minneapolis, Minn.; J. T. Shumaker Motor Car Co., 382 Canterbury road, Rochester, N. Y.; J. L. Strasburg Manufacturing Co., Inc., Albert Lea, Minn.; United Manufacturing Co., 302 Plymouth Building, Minneapolis, Minn.; Valhalla Products Co., 1313 Carman avenue, Chicago, Ill.; Water Gas Carburetor Co., 1504 Grand avenue, Kansas City, Mo.; R. S. Whitney Manufacturing Co., 74 Nichols street, Lewiston, Me.

REPLACING BROKEN CHEVROLET CRANKSHAFT.

(S. J. G., Manchester, N. H.)

I have a 1916 Chevrolet, model 490, which has a broken crankshaft. Will you send me detailed instructions as how to remove it and put in a new one? Will a Ford crankshaft fit my car?

The engine must be removed from the chassis for the work you require. This is a work that will not be practical for one man to handle unless a block tackle or chain fall are available. After the engine is taken out the remainder of the work, up to replacement, can be done by one man. An engine stand is desirable, but if this cannot be obtained one can be improvised by two stout wooden "horses" and two pieces of scantling, two by four inches, extending from the one to the other, the ends being securely nailed to the "horses."

The radiator, radiator support rod, the hood, the water manifolds (intake and outlet), the exhaust manifolds, the carburetor, the wiring, and, in fact, all connections with the chassis frame must be disconnected. The engine supports must be loosened. The five cap screws holding the joint ball retainer collar of the universal joint must be removed, so the ball joint may be pulled from the socket, and the four clamp screws holding the two universal joint rings taken out, so the rings can be separated. The nut holding the universal joint yoke to the transmission shaft can be removed and the yoke drawn from the shaft. The brake rods must be disconnected from the brake shaft. This done the engine may be hoisted from the chassis frame, or it may be lifted with a stout rope sling securely knotted and a section of pipe or a piece of scantling about 10 feet long.

The engine can be placed on the frame or stand and the lower section of the crank case taken off, this being retained by a series of cap screws. The oil should be drained from the section removed. The section can then be cleaned with gasoline or kerosene. The interior of the engine should be wiped clean of oil. Then the engine block should be placed bottom up and the transmission gearset and the clutch removed. These cannot well be taken off as units and will have to be disassembled. With the clutch and the transmission gearset off the flywheel can be removed from the crankshaft flange by taking out the bolts retaining it. The main bearing and the connecting rod caps are next removed, these being marked with a punch so that they can be replaced as originally assembled.

There is every probability that the three main and the four crankpin bearings must be replaced. The journals and crankpins of the new crankshaft will no doubt differ somewhat from those of the broken shaft and the bearings will be found more or less worn. The old bearings might be made serviceable, but this is doubtful, and the safest course will be to renew them. This will require fitting the new bearings to the crankshaft journals and crank pins, a process known as "scraping." This necessitates cutting away the surfaces of the babbitt metal bearings until they fit the journals and pins, a process that appears simple enough, but is done well by comparatively few mechanics.

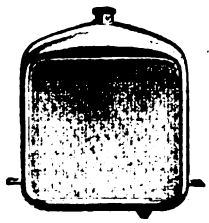
In practise the main journals are clamped in the bearings and the crankshaft turned. All places where the bearing metal is brightened are high and these should be "scraped" with the object of making the surface uniform in its contact

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New Starter For
FORD CARS

No Chains No Clutches No Gears

The Dayton Starter

SPINS THE FORD ENGINE
ABSOLUTELY NOISELESS
HARDLY ANY POWER CONSUMED BY GENERATOR

Agents Wanted in Mass., Maine New Hampshire and Vermont.

Write for Particulars.

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708 Beacon Street, - BOSTON, MASS.

with the shaft. After the first trial of the shaft in the bearing (the work should be done on a single bearing at a time) and the "high spots" are located, the "spots" are cut away, the chips being very small and thin. The journal is then coated with "Prussian blue," a pigment, and clamped in the bearing and turned. The "high spots" are then indicated by the blue pigment transferred from the journal to the bearing. The cutting process is repeated, with the greatest depth of metal at the center of each "high spot," test following test until the surface of the bearing contacts with practically all of the journal. When scraping is done by a skilled worker probably 95 to 98 per cent. of the surface areas will contact. The bearing caps must be set tightly as the work is near completion and the crankshaft may be clamped so that it can be turned with difficulty. When finished the bearings should be as uniform as possible in clamp. The crankshaft will turn easier when lubricated and the bearings will wear under the movement. Close fitting can always be compensated, but loose fitting means new bearings.

The crankpin bearings in the connecting rods can be fitted with the shaft held in a vise or clamped in by the bearings. The process is practically the same as stated for the main journals, but the fit should be somewhat looser. A good fit is when the connecting rod will remain in any position when the cap is clamped tight, so that it will not fall from its weight. Care must be taken to align the pistons, which can best be done by placing the ends of the crankshaft in V blocks and fitting the connecting rod with the piston assembly to the crank pin, testing with a height gauge or square if the alignment of the rod with the shaft is possible. The side of the piston should contact the entire length with the square, the other side of the square connecting with the crankshaft. This is to insure that the piston will not have side pressure against the cylinder.

From what has been stated one will understand that fitting the bearings is work that the average man, no matter how experienced he may be with tools, had best not undertake.

The timing gear is keyed to the crankshaft, and there is no probability of this being placed wrong on the crankshaft, because it can only be put on one way. There is a punch mark on the outside of the timing gear that is nearly opposite the keyway. In the camshaft gear one will note a punch mark near the circumference and near the keyway. The two punch marks should be placed in reassembling the engine so that the tooth of the crankshaft gear bearing the mark meshes into the space between the teeth of the camshaft gear that is similarly marked. By observing this instruction there can be no error in the timing.

The assembly of the engine is practically a reversal of the process of disassembling it. Statement may be made that while the engine is disassembled it should be carefully inspected and all necessary work on it done, the valves ground, all adjustments made and wear compensated. This will insure efficient operation and ought to add but very little to the expense.

A Ford crankshaft cannot be fitted to a Chevrolet engine.

VACUUM FUEL FEED DEFECTIVE.

(T. K. L., Roxbury, Mass.)

My vacuum tank does not deliver gasoline fast enough to keep the engine running. The strainer was clogged once before, but that is all right now. Have taken it apart and inspected all the valves, gaskets, strainer and float. Where else should I look for trouble? This trouble does not happen just after the tank is filled, but only after running a short distance. All parts seem to be in good condition. Pipe from the rear tank to the Stewart tank is clear.

Blow through the suction pipe to the inlet manifold to see if it is clear. Start the engine and pour oil around the joints of the pipe and look for leaks. Your symptoms suggest a clogged vent in the filling cap in the rear main tank. If this hole is clogged atmospheric pressure cannot act to force the gasoline into the Stewart tank.

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Dodge Engine Lags When Heated.

(H. L. W., Rockville, Conn.)

I own a 1918 model Dodge touring car which has developed the following troubles since I purchased it last July. This car was the 1918 "demonstrator" of the local Dodge agent and had been run about 2400 miles at the time I purchased it. Since then I have run about 1000 miles. This car runs fairly quiet up to 15 miles an hour, but above this speed a drumming vibration seems to develop apparently in the transmission or clutch. In moving the clutch pedal back and forth with gears out of mesh, in engaging and releasing clutch, there appears to be at least a quarter inch of play or lost motion in shifting fork before it takes hold. Is this excessive? Compression in all four cylinders of motor is good, cranking by hand after motor is warmed up. When motor is idling there is a distinct knock which disappears when the clutch is thrown out. There is no scoring in cylinders and connecting rods and main bearings have recently been taken up. After running car from 15 to 20 miles motor starts to lag and is hard to accelerate and there appears to be a pronounced lag in its operation. About two months ago I placed my car in a local garage to have these troubles located and remedied and was advised that the pin holding the high speed internal gear to the sliding gear shaft was loose, allowing play of gear; this they claim was repaired, but did not clear up vibration. The distributor head of the ignition system has been recently cleaned and breaker points adjusted according to instructions and seems to function properly. Two weeks ago I cleaned out carbon in head, ground valves, adjusting to .004 cold. In removing two of the valves for grinding found the stems hard to remove; they seemed to stick in valve guides, but did not appear to be gummed, as the stems were highly polished and dry. I cleaned "mushroom" from under side of valve heads, ground them in to good seats and lubricated stems in replacing, but motor seems to lag as badly as before after about 20 miles driving. Carburetor is set lean, as I secure about 22 miles running per gallon of gas. In running I do not exceed 25 miles an hour at any time. Brakes do not drag on drums, water does not boil in radiator, I run with well advanced spark, excepting on steep grades. I have no trouble in making nominal grades in high gear when motor is cool at start, but this is absolutely impossible after running at nominal speed for about 20 miles. I have been advised that a drag could be caused by an overheated clutch release fork due to lack of lubricant, but mine is well lubricated. Motor does not seem to lose compression and crank case does not get hot. Oil level in crank case is kept up at all times. I use standard medium oil.

Is it necessary to take motor from chassis in order to remove transmission and clutch to make repairs to this unit, or would it be practical to block up rear of chassis, release axle housing from springs, block up rear of motor on both sides to release rear side suspensions of motor, disconnect universal joint and remove transmission in this manner?

Kindly advise where I could secure proper sized reamers in making repairs for spindle body and spindle arm bushings, also valve stem guides for 1918 Dodge.

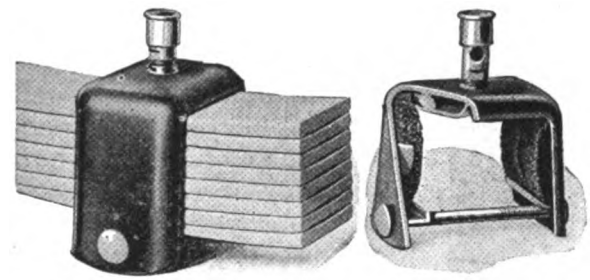
The drumming vibration, which does not develop until about 15 miles an hour speed is reached may result from a loose bolt retaining the clutch housing, or possibly from a loose body bolt. There is little probability that it is in the clutch or transmission unit. Examine the bolts of the clutch and transmission housing assembly and those retaining the power plant and these units in the chassis.

The play in the clutch shifting fork, evident when the clutch pedal is operated, is not excessive and need give you no concern.

The knock heard when the engine is idling, which is not heard when the clutch is disengaged, is caused, in all probability by the play of the clutch disc on the studs on the flywheel. This condition needs no attention. Replacing the discs might obviate the noise, but there is no reason to assume damage or wear will result. The pin holding the high speed internal gear to the sliding gear shaft may be loose, and the gear may have some play, but evidently this was not the cause of the vibration, so this condition may be passed.

The sticking valves, if intake valves, may be found to

BROWN SPRING OILERS



Squeaking springs are always dry and rusty. The leaves soon become frozen and then break. The car rides badly and this causes undue wear and tear on tires, chassis and body.

The Brown Spring Oiler eliminates all usual spring troubles as it lubricates all bearing surfaces. A spring to last and give service must be oiled.

The illustration shows that a Brown Spring Oiler is made to slip over the spring. Once placed it is bolted in position and then filled with oil.

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All jobbers and dealers sell them. Write today for our booklet. It tells how to stop the squeaks, make the car ride easier and how to increase tire mileage.

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Why ride in a shoddy looking car? Make it look like new, don't let the original finish on your car deteriorate, it can be avoided easily and cheaply with PANVAR. The re-coating with PANVAR lasts long as varnish, protects, and is wonderfully lustrous. IT'S SELF-LEVELING and dries perfectly over night—anybody can apply and be certain of pleasing results. Good on body, seats, top and plated parts.

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PANVAR is prepared for cars where ground paint is in fair condition, but varnish has become dull and needs livening up. Such cars anybody can restore to look like new in an hour's time. *If there are bruised places in the ground coat of paint, buy a tube of our* FIX-A-MAR *color to touch up the marred part, at $1.00 per tube, delivered. 12 colors, white or black.*

Send $1.50 1Qt. $5.50 4 Qts. Delivered

25c per quart additional to points west of Rocky Mountains.

Small test sample for 25 cents.

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TWO QUARTS OF PANVAR enough for large car. If finish is much worn two coats may be necessary. Easy proposition for anyone, so why neglect your car or pay a big price for an expensive repainting job? Garage Owners and Dealers, do you realize there are millions of cars needing refinishing twice a year? We can help you to make money with PANVAR. Write for discounts and sales helps.

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WRENCHES that are made for the hardest service. They do not break but grip and hold and their efficiency never lessens.

Economy tools as they last longer, give better service and never become useless through wear.

Utility wrenches of the highest order for car owners and repairers as they can be used in compact places and once set hold like a vise.

The Best Wrench
The Cheapest

All dealers carry in stock the exact size to meet your need. They recommend Coes Wrenches as all good dealers have for more than fifty years.

COES WRENCH COMPANY
WORCESTER, MASS.

DIXON'S GRAPHITE Automobile LUBRICANTS

cling to gear teeth when they are NOT in motion as well as when they ARE moving

Ordinary grease slides off of the gears when stopped—leaving the metal surfaces unprotected when the car starts again.

Write for booklet No. 210-G and lubricating Chart giving name of your car.

Made in Jersey City, N. J. by the
JOSEPH DIXON CRUCIBLE COMPANY
Established 1827

NEW DEPARTURE BALL BEARINGS



Strength
Stamina
Service



The New Departure Manufacturing Co., Bristol, Conn.
Conrad Patent Licensee

have some roughness of the stems. The exhaust valves rarely stick. The intake valve stems ought to be a fairly loose fit—that is, so there is no possibility of sticking. Possibly working down these stems with emery cloth will cause some improvement.

The engine ought to function better as it is warmed instead of better when cold, as you say is the case with your engine. If the engine overheated, which you say you are certain is not the case, the lagging might be explained from this. You say you are certain the brakes do not drag. This would cause lagging, of course. Neither is there probability that the cause is overheating the clutch release fork. This might be true of earlier model Dodge cars that had a bronze collar, but the machine you have has a ball bearing in the collar, and there appears to be no reason why friction should develop in this type bearing. From your statement the engine is normal with reference to cooling and lubrication, and yet there would appear to be either inefficient radiation or dragging brakes. The lubrication system may be defective. Examine it to learn that all the joints are tight and the tubes are not obstructed. You may believe that there is normal volume of oil circulated by the pump, and yet there may be some obstruction that is more pronounced under increased pressure. The oil pressure gauge ought to show whether the oil is circulating normally. With plenty of oil in the engine there should be slight pressure shown by the gauge when the car speed is from 15 to 25 miles an hour. If the clutch is disengaged and the engine accelerated when the lack of pressure is noted, and there are still no indications of oil pressure, the system may be obstructed or a leak has developed. Excessive pressure on the oil gauge at low speed is also an indication of the oil feed pipe being clogged. The strainer should first be examined, next the oil pump and the oil feed tubes. If these are clean and unobstructed and the impeller vanes of the pump turn freely when the crankshaft is rotated, look for the obstruction in the oil feed pipe inside the case, which can be cleaned by blowing out with compressed air after disconnecting the oil feed pipe and removing the blow-out plug at the rear end.

To remove the transmission and clutch the easiest and best method is to disconnect the universal joint back of the transmission gearset, drop the driving shaft and remove the engine, clutch and transmission from the chassis.

You do not need reamers for making repairs to the spindle body and spindle arm. Those are fitted with bronze bushing that may be pressed out and replaced with new bushings, which can be obtained from a Dodge dealer. The valve guides can be pressed out of the engine block and similarly replaced with new guides if the old guides are considerably worn.

ADJUSTMENT OF OLDSMOBILE STEERING GEAR.

(J. P., Manville, R. I., R. F. D.)

Kindly tell me through the columns of the Journal how the steering gear on my Oldsmobile car may be adjusted. The car is a 1916 four-cylinder.

There have been two types of steering gear used on the Oldsmobile since 1915. The steering gear used in 1915 was called the worm and nut type. The adjustment for this type is located at the top of the worm casing. Adjustment can be made by loosening clamping bolt that surrounds this adjusting nut and by turning the nut to the right, tightening the nut against the worm.

In the 1916 and later cars this steering gear is a worm and worm wheel. The adjustment is made by first loosening the set screw and lock nut on the side of the worm case. Turning this screw back will allow the adjusting nut at the top of the case that surrounds the shaft to be turned. Turning this nut to the right will draw the worm into closer relation to the worm gear and tightening the steering gear. Some play should be left in the wheel. About one-half inch is sufficient. Possibly this will not take out all of the play. Sometimes play is shown at the steering arm, where it is made fast to the square of the shaft. This arm is located just outside of the frame and is connected to the steering rod or cross rod, as it is sometimes called, by a ball joint at its lower end. Tightening the bolt where this arm is fastened to the shaft will take up the play.

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Average Mileage Delivered
Last Year—14,000 Miles

OF THE
UNIVERSITY
CALIFORNIA

That's the record of the Hood Extra Ply Tire, size 30" x 3½". What other make of tire can point to such a performance with its resulting low cost per mile?

For the purpose of comparison, consider a so-called "standard" tire of the same size listing at $20.85—recently adjusted on a basis of 3,500 miles—and which may deliver, let us say, 4,500 miles. Figured on a cost-per-mile basis, this ordinary tire shows an actual and final cost of $4.63 for each 1000 miles run.

Figured on the same basis, a Hood—listing at $31—shows a final cost of only $2.21½ for each 1000 miles. The difference, which is $2.41½, proves that in running 14,000 miles on Hoods the user saves $33.81 for each Hood Tire.

Put on a Hood to-day
Forget it for a year

And remember also that—one tube only is required during the life of a Hood, while the "low-mileage" make will require at least three tubes to cover an equal distance. At $4 each, your extra tube expense is $8.

$33.81 plus $8 is $41.81—what you save in running 14,000 miles if your tire is a Hood. Can you afford to be without a Hood?

HOOD EXTRA PLY TIRES

You can buy HOOD TIRES at this sign

Ask the Hood Dealer for proof. And write to us for free booklet, "The Why of the Extra Ply."

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CARBURETOR

WHY?

Because ZENITH Supremacy in Carburetor Simplicity, Power, Reliability and Economy is based upon certain *proven facts.*

SIMPLICITY—Only five moving parts—not one affecting the mixture control—the famous automatic compound nozzle system.

POWER—It takes power to obtain speed. You may not be a speed fiend—but you like to feel power in reserve. De Palma's Packard 905, "the fastest thing on wheels," on Feb. 12th-17th, traveled 1 mile at the rate of 144.7 miles per hour—10 miles at 144.3—20 miles at 134.7. His car was equipped with a stock ZENITH carburetor.

RELIABILITY—This was the FIRST CONSIDERATION in designing the U. S. Naval Trans-Atlantic Planes. The performance of ZENITH on all Liberty engines, made its selection a matter of course.

ECONOMY—The Trans-Atlantic Planes had to count every drop of fuel. Lives depended on their fuel supply not being wasted. This was the SECOND CONSIDERATION on which the Naval experts based their ZENITH choice—a fact to be considered by every motor car or truck user.

These remarkable achievements explain:—

WHY it takes four factories—three in Europe and one in America to supply the world-wide demand.

WHY it was selected for the majority of the fighting planes on the Allied Front.

WHY it was used on the effective French Renault tanks.

WHY it is used by a majority of European automobile manufacturers, including Delage, Peugeot, Gregoire, DeDion and many other well known makers.

WHY it is used by over one hundred manufacturers of passenger and commercial cars in the U. S. A.

WHY YOU should use ZENITH EQUIPMENT.

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TIRE REBUILDING SYSTEM

Nation-wide Service To Motor Car Owners

Buy Only the Better Tires *Now*

If you have been tempted to buy cheap tires, Mr. Car Owner, because the first cost of the better tire is a little more, ***now is the time to stop.*** A cheap tire like a cheap shoe does not stand repairing and rebuilding. Buy ***only*** the Better Tires now because:

They give you the greatest known mileage, and ***in addition,*** under the SAVOLD rebuilding system, they give you this original mileage again, and in some cases, a third time—***at half the cost of a new tire.***

The SAVOLD rebuilding system combines scientific production, volume, unlimited buying power and rigid control of workmanship.

The New York SAVOLD plant at 227 to 245 W. 61st Street is the most complete, scientifically equipped tire plant in this country. Plans are rapidly nearing completion for the operation of similar model plants in all important centers from Boston to San Francisco.

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5 COLUMBUS CIRCLE **NEW YORK CITY**

SAVOLD TIRE CORPORATION

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A Smaller Fine Car

is *the* logical sales proposition

Dealers who have seen and driven this new Allen have unqualifiedly pronounced it ***the*** smaller fine car.

The reason is this:—the new Allen is amply big for five passenger ease but it isn't large or lumbering.

Because it is skillfully designed, it rides easier in the rear seat than any car anywhere near its size, and it gets that result without lengthy wheel base.

It handles nicer and is more snappy in acceleration than any large car — is a better hill climber and, of course, more economical.

This new Allen is exactly the kind of car people want, which, reduced to business terms, means that it is a great dealer proposition.

There is territory still open, but going fast. Write at once, if interested.

The New Allen Touring Car
FIVE PASSENGER
$1295 f. o. b. Columbus, Ohio

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The car of the year

METZ

MASTER SIX

A New England Product
Honest through and through

METZ SALES CORPORATION
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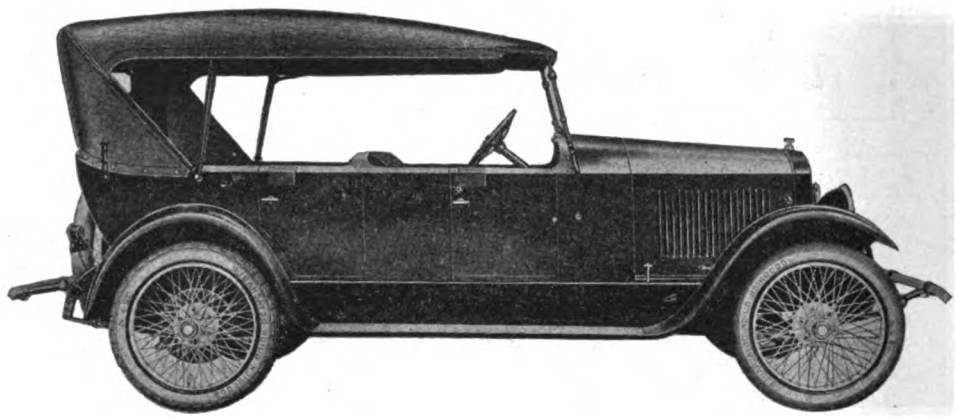
GEAR DRIVE

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METZ MASTER SIX

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Elegance - Luxury

Measured by any standard the METZ MASTER SIX is a car of distinction, — in design, in finish, in appointments, — a construction that admirably harmonizes.

No machine is more complete—no vehicle could be more carefully thought out and no car was ever perfected with greater regard for the requirements for every purpose.

Every quality has been considered. Every possibilty has been appraised and the entire design has been developed to meet the demands of those who keenly discriminate.

There is elegance in the proportioning of the body, in the graceful, sweeping lines, in its simplicity and dignity.

In every detail is evident the qualities that will make for motoring pleasure—for the driver who exacts flexibility and uniformity of acceleration on level ways and steep hills; who demands ease of control with wheel, pedal and lever; who wants perfect lubrication, small consumption of fuel, large tire mileage, and construction that means well nigh constant service with minimum of maintenance cost.

In the METZ MASTER SIX this means the fullest degree of comfort. That long, slow resiliency of the springs that absorbs all shocks and insures against fatigue; that depth of high grade leather upholstery that conforms to one's body and affords restful support; the ample space in which one can move unhampered and without cramping.

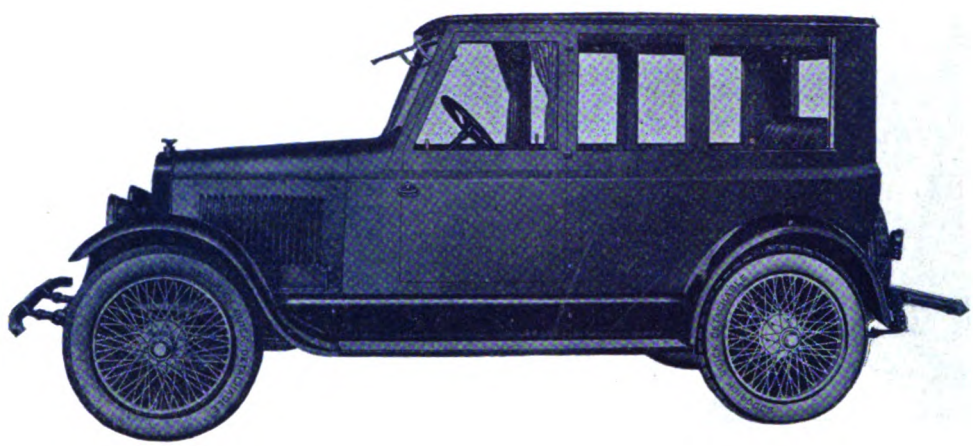
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METZ MASTER SIX

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Service - Endurance

The utility and satisfaction realized is in ratio to the design and the construction.

The METZ MASTER SIX is the conception and the creation of the Master—METZ—the choice of units with reference to materials, workmanship, appearance, accessibility and simplicity—the products of the best specialists of the industry, and combining them into a perfectly balanced assembly that will afford every quality that makes for undoubted superiority.

Service in the METZ MASTER SIX means that this car will measure up to every standard by which satisfaction is determined. Whether it be appearance, finish, convenience of appointments, comfort of passengers, ease of control, power, flexibility, safety, tire mileage, economy of maintenance, the car is equal to any machine built, and is unequaled when all of these qualities are considered as applied to a single design.

Endurance is meant to apply to period of utility, to the service life that can be expected. The METZ MASTER SIX is built for years of use. Every construction unit is known the world over for quality. No car was ever designed with greater factors of safety. Only with such units could a car of equal strength and light weight be realized.

There is in the METZ MASTER SIX greater value represented than any other car, because METZ owners enjoy all the superior qualities at far less expense. The best measure is a knowledge of other cars. Make every possible comparison. See them all without regard to price. Then you will learn that on the basis of quality the METZ MASTER SIX has been rightly named the PERFECT CAR.

GEAR DRIVE

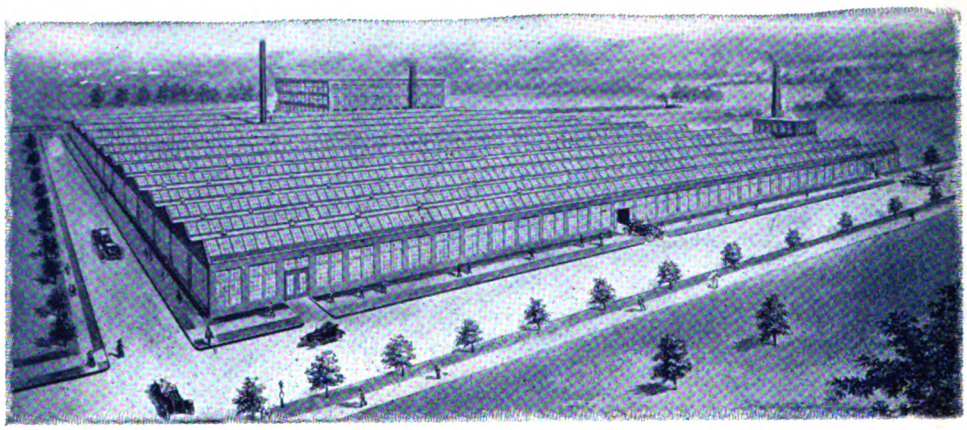
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METZ MASTER SIX

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Metz Main Factory, Where the Metz Master Six Is Built



Specifications of Metz Master Six

MOTOR—MASTER SIX, 3⅛x5, L head type six cylinder en bloc—unit power plant, with fully enclosed valves and detachable cylinder head.

FORCE FEED and Splash. Positive pump circulation to all parts of motor. Pressure indicator on instrument board, gauge on crank case.

CARBURETOR—STROMBERG Float Feed automatic type. Double jet, intake air heated, instrument board adjustment.

ELECTRIC EQUIPMENT—WESTINGHOUSE two unit lighting and starting systems.

IGNITION—CONNECTICUT distributor independent of generator.

BATTERY—WILLARD 6 volts, 120 hour ampere.

GASOLINE SYSTEM—15 gallon capacity tank carrier on rear. STEWART vacuum feed to carburetor, gasoline gauge.

STEERING GEAR—Worm and gear type, irreversible 18" special finger MASTER SIX walnut steering wheel, spark and throttle control levers and horn button mounted on top. Left side drive.

CONTROL—Center gear shift lever and emergency brake hand lever.

TRANSMISSION—BROWN-LIPE, selective sliding gears; three speeds forward and reverse; nickel steel gears; special alloy steel shafts. Unit construction aluminum case.

CLUTCH—BORG & BECK single 10" dry disc type, positive—yet disengaged by a gentle push on clutch pedal.

DRIVE—Hotchkiss type; two universal joints and tubular propeller shaft.

LAMPS—Special MASTER SIX electric head and tail lamps with double bulb for dimming, dash and rear compartment lamps.

RADIATOR—Special MASTER SIX, Duplex cooler, copper tubes, cellular type, generous cooling surface, ample water capacity.

COOLING—Water, positive centrifugal pump circulation.

FRAME—Pressed steel channel section very wide in rear, tapering straight to front.

SPRINGS—Special alloy semi-elliptic; front 38" long, 2" wide, rear 54" long, 2" wide, underslung; suspended directly under frame.

AXLE—Front MASTER SIX, TIMKEN, single-piece drop-forging; I-beam section, heat treated TIMKEN bearings.

AXLE—Rear MASTER SIX, TIMKEN, ¾ floating type, pressed steel housing, spiral bevel driving gears, accessible from rear, TIMKEN bearings.

BRAKES—Service, 14½" external contracting on rear wheel; 2" wide with equalizer. Emergency internal expanding.

WHEELS—5 MASTER SIX wire wheels white enamelled—standard equipment for detachable straight side type tires. Artillery type optional.

TIRES—32x4 GOODRICH, plain tread on front, and Non-Skid or Safety tread on rear. Six ply.

EXTRA WHEEL CARRIER—Special design mounted on rear with safety lock.

LICENSE TAG HOLDERS—Front—special arrangement on lamp spacing rod. Rear—integral with lamp.

BUMPERS—Special MASTER SIX design front and rear.

BODY—Five passenger, pure stream line MASTER SIX Colonial design—custom made, sturdy and extremely comfortable, roomy and of pleasing appearance, deep wide cushions, flush type well fitted doors designed to eliminate all rattle.

WINDSHIELD—MASTER SIX two-piece ventilating and rain vision.

FINISH—Highest grade custom coach work throughout. Royal blue with black enamelled guards and trimmings. White enamelled wire wheels, durable carpeted floor in rear, and special gray Linoleum covered floor in front, with running boards to match. Instrument board of dull finished walnut, with steering wheel special design to match and panel of walnut front of rear compartment.

UPHOLSTERING—Straight piped, fitted upholstery. Genuine deep buffed black leather cushions and back.

TOP—One-man, with curtains and top boot, curtains carried in pocket in top, using Dreadnaught water proof topping material.

SPEEDOMETER—STEWART, flush type, mounted on instrument board, driven through special gears at rear of transmission.

WARNING SIGNAL—Electric motor driven, operated from steering wheel.

EQUIPMENT—MASTER SIX one-man top with top cover and quick adjustable interior fastening side curtains; MASTER SIX rain vision, ventilating windshield; speedometer; motor driven horn; headlights with auxiliary bulbs; dash, rear compartment and tail lamps; ammeter; oil pressure indicator on dash; bumpers front and rear; extra wire wheel on rear with special carrier and safety lock; special robe rail; pump; jack; tool kit in special pocket; tire repair outfit; ignition lock.

WHEELBASE—120 inches, tread 56 inches.

WEIGHT—2750 lbs. shipping weight; road weight with full tanks 2850 lbs.

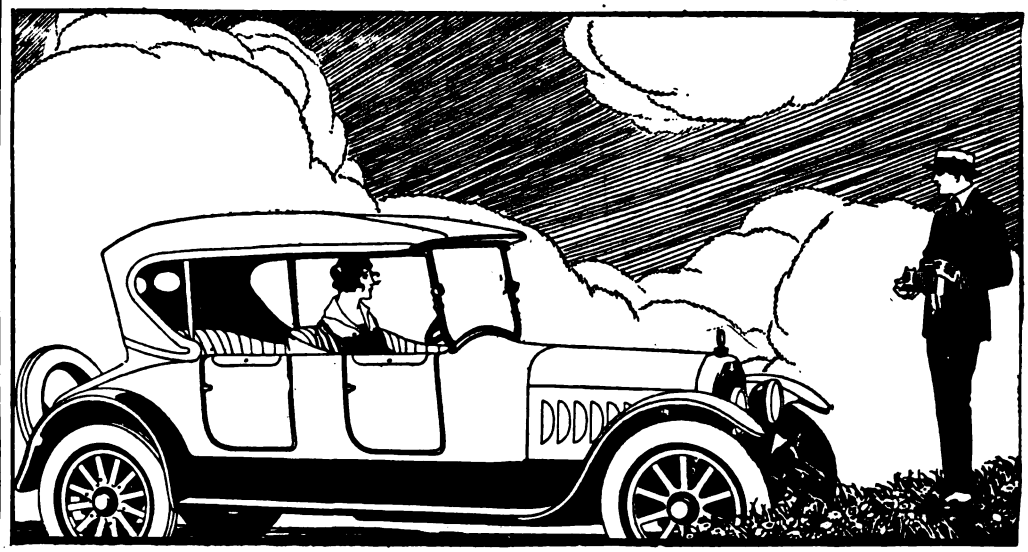
PRICE—Fully equipped, $1695, F. O. B. factory.

METZ SALES CORPORATION

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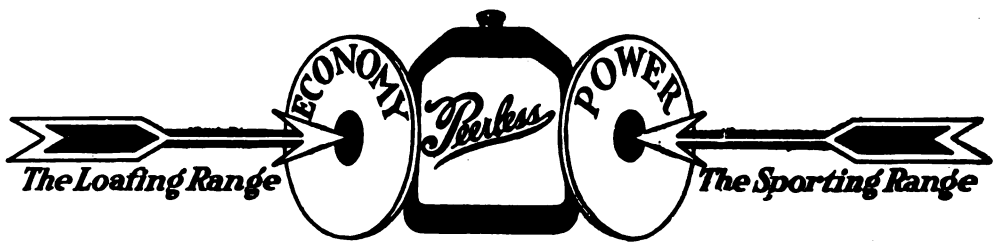
The New Peerless Four-Door, Four-Seater. Very Smart, Very Comfortable

For the Peerless Two-Power Range, Eight Cylinder chassis this new roadster body has been created. It has four doors, and seating space for four passengers.

Its roominess permits a comfortable touring position for occupants of driving compartment and tonneau. It may be quickly and snugly enclosed with the side curtains.

There is a luggage compartment at the rear. Our allotment in cars of this type is limited but at present we can promise reasonably prompt delivery.

Do you know the thrill of driving the Two-Power Ranger? It is a thrill that can not be explained. To be understood it must have been experienced. May we not place a demonstrating car at your disposal.



The Peerless Motor Car Company

Cleveland, Ohio.

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DORT

Quality Goes Clear Through



TOURING CAR
$925

The joy of the open highway, of swift, cool flight along winding mountain roads, is yours in a Dort.

Its simplified mechanism performs competently and smoothly in all sorts of going.

It pulls sturdily and powerfully in heavy traveling. It handles lightly and easily. It rides with a surprising comfort.

And above all, it gives a service that is uncommonly free of trouble. The simplicity of its design renders service-attention highly infrequent. And the accessibility of its construction enables you to adjust or tune up any part without expert assistance.

Prices F. O. B. Factory
Wire Wheels and Spare Tires Extra

(67)

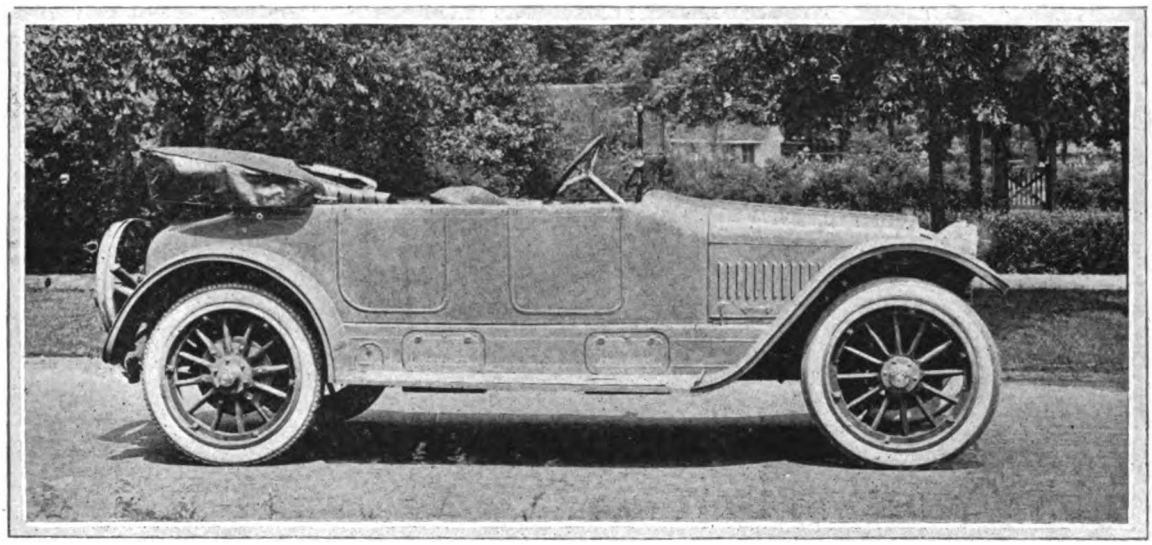
DORT MOTOR CAR COMPANY

Flint Mich.

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The Waltham Automobile Clock

More Than a Quarter Million Now in Use as Standard Equipment



Winton 6-33 Four Passenger Roadster Equipped with Waltham Automobile Clock

It isn't enough that your automobile clock should keep good time under ordinary travel conditions. To be really valuable it must tell the right time all the time.

And a Waltham Automobile Clock can be relied upon to do this because it is scientifically constructed to withstand road shocks and changes of temperature.

It has a jeweled eight day movement, two mainsprings, and a winding indicator which flashes a red signal on the dial every seventh day.

The superiority of the Waltham Automobile Clock has led to its adoption as standard equipment by the makers of the fine cars listed on this page.

WALTHAM WATCH COMPANY
WALTHAM, MASS.



Waltham Model F

List of cars carrying Waltham Clocks as standard equipment

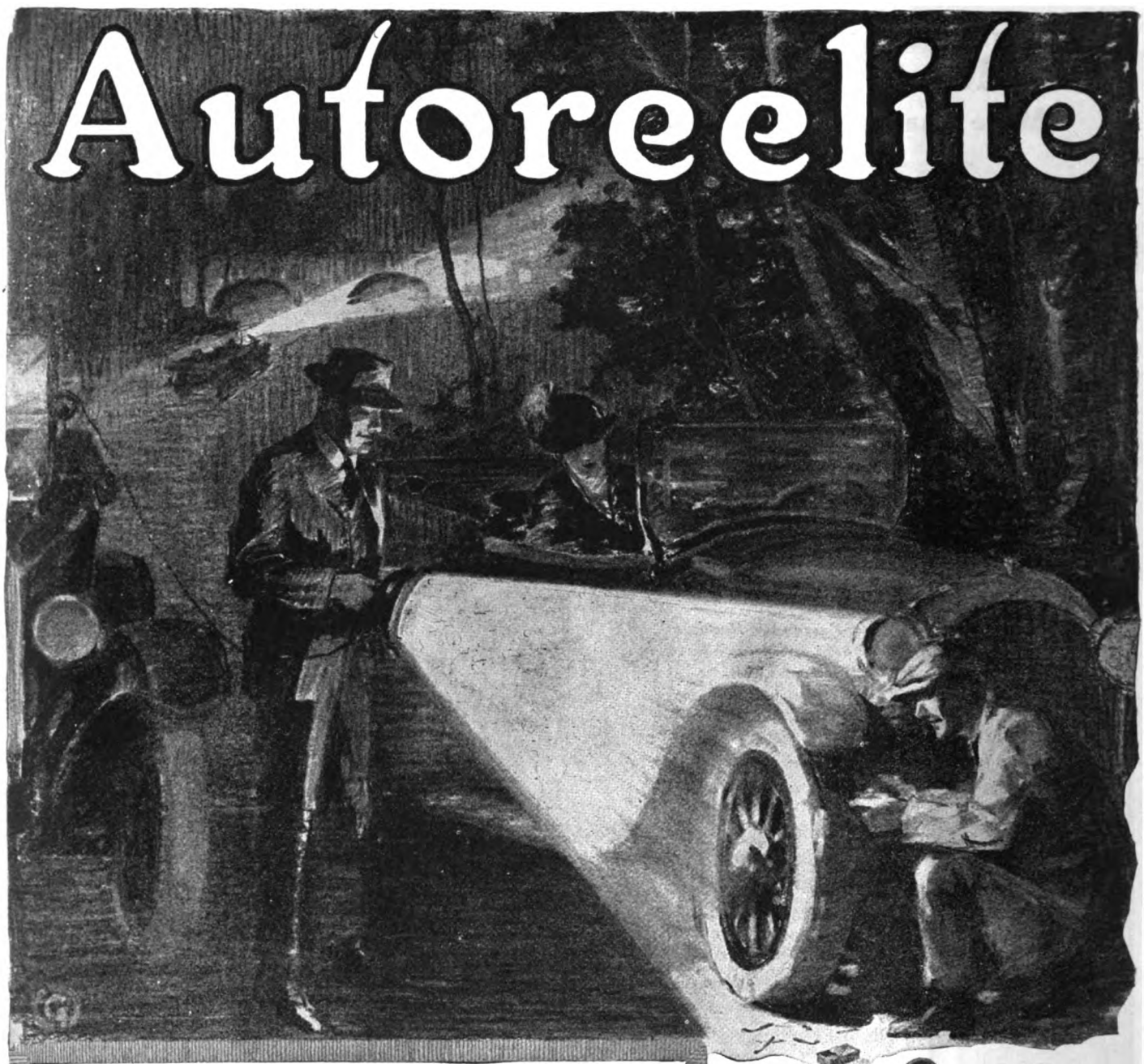
Anderson 6-40	Franklin	Mercer
Apperson	Haynes	Owen-Magnetic
Brewster	Hollier	Packard
Cadillac	Hudson Super-Six	Pierce-Arrow
Cole	Jordan	Rauch & Lang
Cunningham	Kissel	Studebaker
Detroit-Electric	Locomobile	Willys-Overland
Dorris	Marmon	Winton

WALTHAM

THE WORLD'S WATCH OVER TIME

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Autoreelite

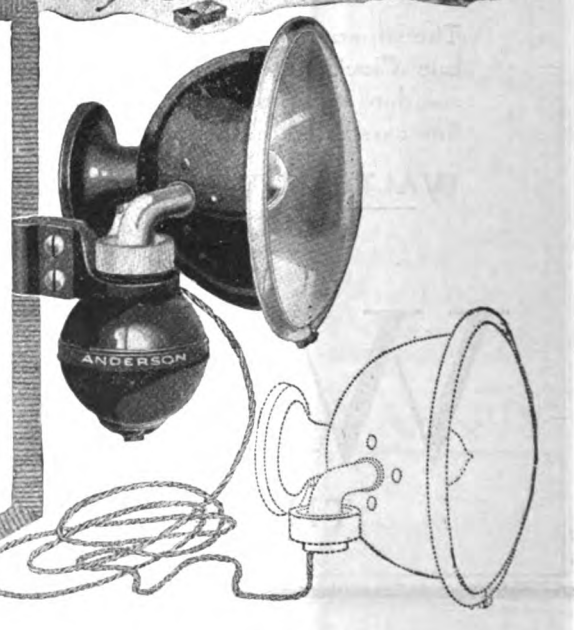


He's Lending His Spotlight!

He's a friend in need to the chap who relies on pocket flashlights or old-fashioned trouble-lamps with loose parts. His car is equipped with Autoreelite.

Autoreelite is a powerful, self-contained "spot-light on a reel." Two twists of the thumb and finger and Autoreelite can be reeled out any distance to 12 feet. Attached to windshield—fits any car.

Priced no higher than ordinary spotlights—seven-inch size, $10. Six-inch size, $9. Other models. Write for full information—ask for Booklet J207.

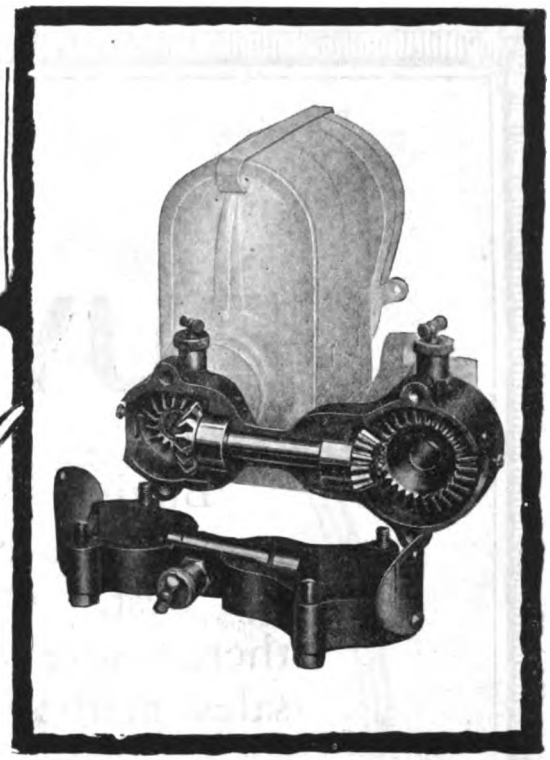


ANDERSON ELECTRIC SPECIALTY CO.
118-124 South Clinton Street · · *Chicago, Illinois*

(When Writing to Advertisers, Please Mention the Automobile Journal.)

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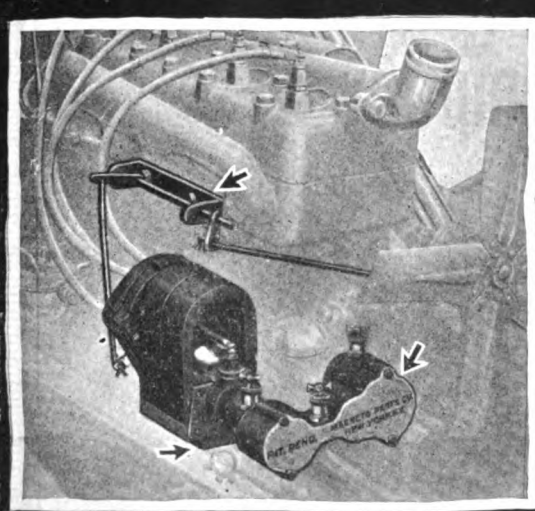
High Tension *MAGNETO ATTACHMENT* For Fords

More "pep," quicker starting, greater power and hill-climbing ability, speed and flexibility—wiring simplified to four short wires—economy of fuel—these are a few of the good things High Tension Magneto Ignition does for a Ford.

And it eliminates misfiring, overheating of engine and adjusting of vibrator, clears the dashboard of cumbersome coil-boxes and permits use of the Ford Generator for lighting and operation of the electrical accessories.

HY-TEN

MAGNETO ATTACHMENT



Installing a Bosch, Eisemann, Splitdorf, Sims, Berling, or any other standard magneto on a Ford car is a simple matter with the HY-TEN. A novice can do it in 30 minutes, without special tools.

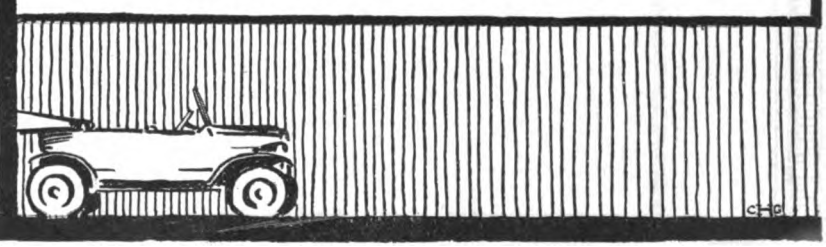
Simple in construction. Attachment complete includes magneto base, gear housing, gears, spark advance rod, with all bolts and screws needed for installing.

RETAIL PRICE $25. *Liberal Trade Discounts.*

A Big Money-maker for Live Dealers. *Write for Agency Proposition.*

MAGNETO PARTS COMPANY

1784 Broadway **New York**



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BUYING OIL

Buying oil by the quart, as needed, may be the easiest way, but not always the best. Of the hundreds of brands there is sure to be some low grades. The safest method is to specify

Supreme Auto Oil

You get a good lubricant which leaves less carbon in the cylinders.

There is MORE POWER in THAT GOOD GULF GASOLINE

Ask any dealer at the sign of the Orange Disc.

Gulf Refining Company

New York Philadelphia Boston
Atlanta New Orleans Houston

General Sales Office: Pittsburg, Pa.

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You Can Eliminate Most of Your Tire and Tube Troubles.



SUPERFIX will save from 500% to 800% of your wasted time and money.

RUBBER SUPERFIX REPAIR

A tire or tube mended with SUPERFIX stays mended and any one can do the work. No heat, tools or acids needed and weather cannot affect it.

It is produced by tire makers, men who know all tire and tube problems.

SUPERFIX is not a cement or a patch. When used SUPERFIX becomes part of the rubber.

FOR TIRES

It is a rubber mend for glass cuts, rim cuts, holes and sand blisters. It will prevent blow outs and most other tire troubles.

FOR TUBES

SUPERFIX mended punctures can be immediately placed in casings and the tires wholly inflated. For long cuts and extremely bad repairs 6 to 12 hours is required. For valve pads it is unequaled.

SUPERFIX is a permanent and positive cure. There is nothing like it and it is just as practical for rubber boots, hot water bags, rubber gloves, hose, etc.

Repairs that vulcanizers consider impossible can easily be done with SUPERFIX.

SUPERFIX will splice a tube as effectually and permanently as it heals a puncture. It makes good tubes out of bad ones.

List price, $1.00 per can. Discount on request

Order it—Sell it—Use it

Time required to use Superfix	Vulcanizing Cost	SUPERFIX Cost
Punctures..3 to 5 minutes	30 punctures @ 25c..$7.50	30 punctures @ 1½c $0.45
2 inch cut....7 minutes	5 blowouts @ 40c.. 2.00	5 blowouts @ 7c... .35
12 inch cut..20 minutes	2 tire cuts @ $1.00.. 2.00	2 tire cuts @ 10c.. .20
Tire cut..5 to 15 minutes	Total.....$11.50	Total.....$1.00

SUPERFIX Tire Paint.

In white, grey, red and black. This paint makes the tires look new and finds the small cuts and holes which prevents the water and sand from getting thru to the fabric and thereby gives greater wearing efficiency to the tire.

"SUPERFIX Casing Repair."

It is much like SUPERFIX, but is grey and gets harder and will wear with the tire.

JOBBERS and DEALERS: We offer the most dependable and attractive line made. Our terms and discounts make it a decided object for you to sell our products.

The Superfix Rubber Company

Elyria Ohio

The Superfix Rubber Company
Elyria, Ohio

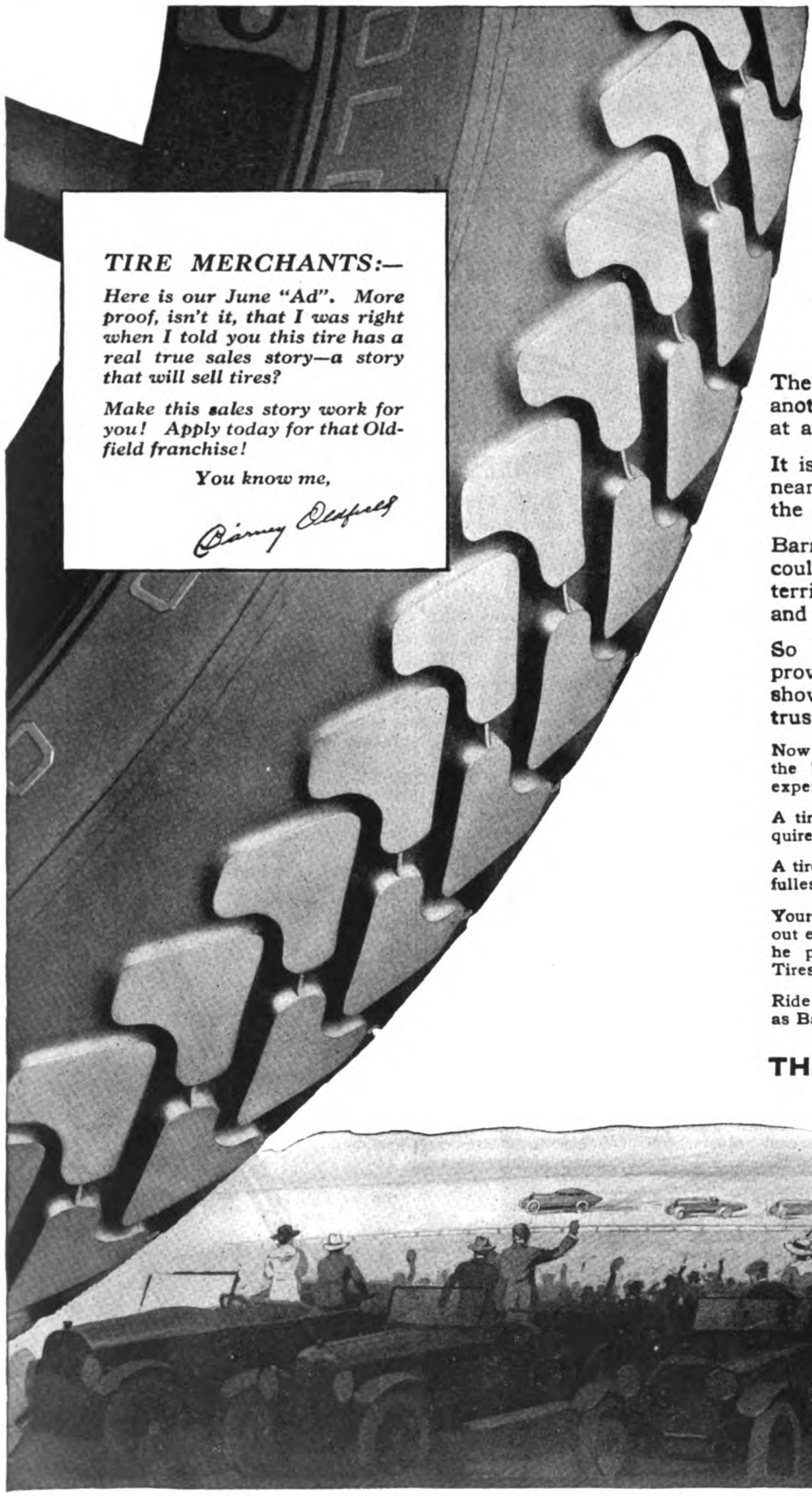
Gentlemen: Enclosed please find one dollar for trial can of SUPERFIX. We understand that you guarantee this.

Name.....

Street.....

City.....State.....

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TIRE MERCHANTS:—

Here is our June "Ad". More proof, isn't it, that I was right when I told you this tire has a real true sales story—a story that will sell tires?

Make this sales story work for you! Apply today for that Oldfield franchise!

You know me,

Barney Oldfield

It Took 20 Years To Build This Tire

The Oldfield Tire is more than just another new tire. It is not a new tire at all.

It is a development—a development of nearly 20 years of study and test, by the greatest tire user in the world.

Barney Oldfield had to have tires he could trust—tires that would stand the terrific strain and grind of the race track and transcontinental trail.

So he developed Oldfield Tires—improved them, year by year, till they showed themselves fully worthy of the trust he placed in them.

Now The Oldfield Tire Company brings to you the benefits of this unique tire research and experience.

A tire that has answered Barney Oldfield's requirements will answer yours.

A tire Barney Oldfield trusts is worthy of your fullest confidence.

Your experience with Oldfield Tires will bear out everything the "Master Driver" says when he pronounces them "The Most Trustworthy Tires Built."

Ride on Oldfields. You will learn to trust them as Barney Oldfield does.

THE OLDFIELD TIRE CO.
BARNEY OLDFIELD
PRESIDENT
CLEVELAND, O.

OLDFIELD TIRES

"The Most Trustworthy Tires Built"

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Powrlok Drives the Wheel That Has Traction

An ordinary differential spins the wheel that *has lost traction*, letting the power leak into every mud hole, or snow bank, by refusing power to the wheel that is still gripping the road.

That is why trucks and passenger cars get stalled and skid.

POWRLOK works just the opposite. When one wheel loses its grip, POWRLOK automatically swings all the power over to the wheel that has traction and the truck or car pulls through.

POWRLOK eliminates 50% of the danger of skidding. It saves tires by preventing slippage.

POWRLOK is used by Torbensen, Timken and Clark, the leading manufacturers in the world of rear axles. It is used on the Nash Quads in Overseas Service. It is on the Militor Truck, the standardized four-wheel truck designed by the Government just before the Armistice. It is in service on the leading industrial trucks.

It is being adopted by the entire Automobile Industry as fast as engineers can be given demonstrations.

Write for complete data and specifications.

TRADE MARK

POWRLOK

"MORE THAN A DIFFERENTIAL"

THE POWRLOK COMPANY

Successor to **M. & S. Corporation**

1107 East 152nd Street, Cleveland, Ohio

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Hartford Wins Again at Indianapolis



First
HOWARD WILCOX

Second
EDDIE HEARNE

Third
JULES GOUX

equipped with Hartford Shock Absorbers.

It is significant in this year's Classic at Indianapolis Wilcox, Hearne and Goux used Hartford Shock Absorbers.

Yet this merely sustains the winning tradition of Hartfords. In every important event for years past the speed kings have invariably equipped their cars with Hartfords.

The reason behind their selection of the Hartford teaches a valuable lesson to every car owner, dealer and manufacturer in the country.

In these gruelling tests of speed stamina and driving the speed of the car magnifies the smallest bump or road shock a thousand times so that what would be a slight jar at 25 or 30 miles an hour becomes a sledge hammer blow at 75 to 149 miles.

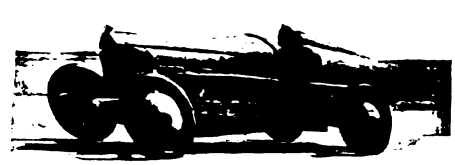
Think what this means on a car like Wilcox's Peugeot which attained the speed of 92.7 miles per hour.

What Hartfords do for the racers at record-breaking speed they will do for any car at any speed and every speed. For the racers simply crowd into MINUTES the wear and tear the car would ordinarily get in years. And the protection to tires, mechanism and person—so essential to their safety, is just as vitally essential to the average car owner's pleasure and profit from his car.

EDWARD V. HARTFORD, Inc., Jersey City, N. J.
BOSTON BRANCH 319-325 COLUMBUS AVE.

Hartford
SHOCK ABSORBER

Ralph De Palma's record breaking Packard which attained a speed of 149 miles ver hour at Ormond Beach was, of course, Hartford equipped.



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11 Spark Plug Facts



1- Corporation
2- Policy
3- Engineering
4- Improvement
5- Manufacture
6- Assembly
7- Quality
8- Sizes
9- Service
10- Sales helps
11- Deliveries

A presentation by

The Red Head Spark Plug Corporation



261 Broadway New York City

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SPARK Red Head PLUGS

Red Head
TRADE MARK REG U.S PAT. OFF.
Spark Plug Corporation

Was organized because we have absolute faith in the judgment of the people and in quality.

We understand that nothing succeeds that does not have quality and the measure of success is the ratio obtained by comparison—not with one—but with all competitors.

As a matter of business precaution we turned to the users and learned first hand the experience of owners of cars, trucks, tractors, power yachts and stationary engines with Red Head Vitristone Spark Plugs.

We had the conclusions of those who spoke from knowledge of service of different types and makes of spark plugs and were free to make their criticism—who had nothing to gain or lose and no purpose to serve by the expression of their opinions.

It was the statements of those who paid for their experience, and who of all others should know, that influenced us to acquire the patents and all the manufacturing rights covering Red Head Vitristone Spark Plugs.

Our object was first of all to control and then develop what we believe has extremely large possibilities. The best evidence of our confidence is our investment and the organization of the Red Head Spark Plug Corporation.



Big Boy
⅞"-18 (S. A. E.)
also
½" and Metric

(Continued)

Red Head Spark Plug Corp.
261 Broadway,
New York.

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SPARK Red Head PLUGS

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Spark Plug Corp. Policy



Standard ⅞"-18
also
½" and Metric

The policy of the Red Head Spark Plug Corporation was determined after careful consideration of first, the business, and second, the engineering possibilities, for development.

Our object is to sell spark plugs, more spark plugs, and still more spark plugs, but as spark plugs must endure to satisfy the user, this means convincing buyers and developing the potential market through the knowledge of

Spark Plug Quality

We knew that the users of Red Head Spark Plugs believed in the quality of the plugs.

We knew that motorists cared nothing about who manufactured or sold the plugs, but they were vitally concerned in knowing that the plugs they buy would at least equal what they have bought, and be, if possible, still better quality.

The future depended entirely upon production, and primarily, upon engineering and design.

We also knew that the future depended upon satisfaction given users and the measure of service given by the plugs depended absolutely upon quality of materials, engineering and design, and with these facts in view we proceeded to investigate further.

(Continued)

Red Head Spark Plug Corp.
261 Broadway,
New York.

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SPARK Red Head PLUGS

Red Head
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Spark Plug Engineering

Spark Plug Engineering—the phase may have the sound, to many, of a play upon words. But there is as great need for engineering in spark plug design and construction as there is in designing and constructing a magneto, a battery—in fact, any unit that must be dependable and which is used hard and habitually neglected.



Standard ½" Long Body for Ford.

A spark plug may be constructed of extremely cheap material that will serve. For a short time it may be reasonably serviceable, but frequent renewals rapidly increase the aggregate cost and there is besides the incidental loss of time, vehicle service, labor, trouble, annoyance, and, worst of all, uncertainty of use, all of which are obviated by the higher priced but dependable spark plug.

A spark plug is seemingly such a simple device that production is often regarded as a mere matter of assembling parts that can be produced at trifling cost and without regard to accuracy of combination or exactness of relation.

But there are many potent factors—the use that is made of a spark plug, the high and greatly varying temperatures, the variance of high expansive force, the differing expansion of parts, the resistance to gas leakage, the electrical conductivity, the quality of insulation, the type of gaskets, the exactness of relation of parts, the accurary of workmanship and inspection and testing.

These were some of the factors considered and investigated, and the results opened the channels for possibilities for better construction and further improvement on the many good qualities so well known of Red Head Vitristone Spark Plugs.

(Continued)

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SPARK Red Head PLUGS

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Spark Plug Improvement



Big Boy
½"-½" Ext.
(Reo, Chalmers, etc.)

The best engineering talent obtainable was engaged and directed to Red Head Spark Plug development. We had the patents that insure to us the exclusive use of Vitristone insulators, but we wanted something more than this—we wanted to so produce Red Head Spark Plugs that there would not only be better quality, but uniformity of quality, that there would be certainty of satisfaction with all plugs made.

The Vitristone insulator is the best insulator or core made—we were certain of this, but we determined to improve this, if possible.

The combinations of materials were studied and experimented, tests being made to determine the qualities of each for spark plug insulation with reference to heat, oil and electrical resistance, to temperature variations, to endurance of vibratory and impact stresses, and for variability of production from various causes.

Then followed careful study of the processes of manufacture and study of plant equipment with reference to determining workmanship and the possibilities for improvement so there would be insurance of quality of all insulators, minimizing loss from defects and perfecting the output of the factory.

This led to determinations of economies obtainable through increased production and the possibilities were such as to justify the establishment of a new plant at Newtown, Pa., where the crude materials and the special fuel could be assembled to best manufacturing advantage.

This new plant was built and equipped and it is now in production, its facilities being so installed that expansion of output to meet any demand is practically possible. No expense has been spared to make this plant highly efficient in equipment and organization and to produce better Vitristone insulators than were ever before made.

(Continued)

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Spark Plug Manufacture

Production of the Vitristone insulators was but one of the details of Red Head Spark Plug manufacture to be studied. No processes were regarded as perfect and endeavor was made to improve these.

The experimental work was begun with the raw materials and these were followed through each stage with the object of perfecting whatever might promise practical results.



Standard
⅞"-18 ½" Ext. for Buick

The Vitristone insulators are tested and inspected at the plant before shipping. They are tested and inspected again at the New York factory. The bushings and shells are automatic screw machine products, and the settings of these machines are gauged systematically and the bushings and shells inspected individually so that no defect shall be found in further inspection that can humanly be detected.

The electrodes are inspected for length and thread (analysis determines the content of the nickel manganese steel wire upon receipt of each shipment) and the electrically welded electrodes of the "Big Boy" types are examined to detect possible flaws in welding because conductivity is imperative.

The insulators and electrodes are assembled and the insulator bores filled with a special compound under heavy pressure that is baked at 900 degrees Fahrenheit for 24 hours, the compound becoming practically a part of the insulator and positively sealing the bore against leakage.

Again the insulators are tested for electrical conductivity and with heavy pressure to determine whether they will resist the expansive forces of the cylinder explosions. The insulators must have perfect resistance to 25,000 volts and the finished plugs are tested for leakage with 150 pounds air pressure before being passed as ready for distribution.

(Continued)

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New York.

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SPARK Red Head PLUGS

Red Head
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Spark Plug Assembly

Red Head Vitristone Spark Plug shell electrodes are cut and formed from nickel manganese steel wire at one operation, and are shaped to resemble fish hooks, so that lubricant thrown upon them may drain to the lowest point, where it will drop off, thus preventing possibility of oil drops closing the circuit and stopping sparking.

Each of these shell electrodes is inspected first when made and second when placed in the bore drilled in the shell. Three of these electrodes are fitted in each shell of the "Big Boy" Plugs for high compression engines, this being a further insurance of service.



Standard ½"-½" Ext. for

In assembling the spark plugs the electrodes are clamped into the bores by heavy pressure presses, so there is perfect metallic contact and certain conductivity.

Red Heads are made gas and pressure tight by our own copper-asbestos gaskets, one seating against the shell and one against the bushing, and the bushing is seated by hand pressure with a special wrench, for only by "feel" can the expert operator determine when a seat that will insure against leakage and not crush or destroy the elasticity of the gaskets is reached.

Then the electrodes are adjusted for the "gap" by hand and again is the plug tested for conductivity and for pressure resistance, and it is given a final inspection to be certain that the work is up to shop standard and that the plug will go to the shipping room with the certainty of maintenance of Red Head quality and service.

This statement is intended to show to spark plug users the care given to insure quality and to incidentally lessen production losses, because high efficiency means better work and a greater degree of satisfaction to all Red Head Vitristone Spark Plug users.

(Continued)

New York.
261 Broadway,
Red Head Spark Plug Corp.

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SPARK Red Head PLUGS

Red Head
TRADE MARK REG. U.S PAT. OFF.

Spark Plug Quality



Big Boy
⅞"-18 (S. A. E.)
With Special
Willys-Knight
Terminal.

Quality in engineering, in design, in construction, in materials and in workmanship has been sought in the production of Red Head Vitristone Spark Plugs.

Degree of quality is established by what is definitely KNOWN of a product. As a manufacturer we have not hesitated to do whatever will in the judgment of experts improve the plugs, basing judgment of improvement on carefully determined standards that have been adopted with exact knowledge of results to be obtained.

Quality is the measure by which judgment is made and it is the measure that is best understood. In the final analysis it is "what you get for what you pay," whether the price be large or trifling.

But our knowledge of quality is not only based on engineering and production, it is far better established by the service result realized by users, which justifies the claim that Red Head products are the

Best of All Spark Plugs

This service is not what we claim it will be, but what the users know it is; what they have learned by experience in all types of engines and in every condition conceivable; in every form of power vehicle, in yachts, in tractors, in motorcycles, in airplanes and in stationary plants.

Neither is it based on short periods, but upon long service, extending in many instances over years and without exception upon comparisons impartially made with all other makes irrespective of type or price.

(Continued)

Red Head Spark Plug Corp.
261 Broadway,
New York.

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SPARK Red Head PLUGS

Red Head
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Spark Plug Sizes

Red Head Spark Plugs are made in several types and sizes to meet any particular requirement. All of the probable variables of engine construction have been provided for.



½" Priming also ⅞"-18 and Metric

The Standard series includes ½" Regular, ½" Long Body for Ford cars, ⅞"-18, and Metric.

The Extension series includes ½" for Overland and Reo cars, having ½" Extension; the ½" for Metz cars, having 1¼" extension and the ⅞"-18 for Buick and Chalmers cars, having ½" extension.

The Big Boy series, to take care of extremes of heat, compression and vibration, consists of ½", Metric and ⅞"-18, as well as ½"-½" Extension, and ⅞"-½" Extension.

The Priming series are made in ½", ⅞"-18 and Metric sizes and have a small cock with a funnel opening installed upward. This priming cock facilitates starting at all times, especially in cold weather, as it conveys the priming gasoline to the sparking points, where the heat from the spark instantly ignites it. This is an advantage even where priming cocks are installed on engine, as ordinary cocks introduce gasoline to a point too far distant from the sparking points to be of any use.

A special plug is also made for motorcycles, in all sizes. All the above Red Head Products are made with care that insures Red Head Quality, and bear the trade name and trade mark that guarantees to all buyers fullest "RED HEAD VITRISTONE" Utility.

(Continued)

Red Head Spark Plug Corp.
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New York.

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SPARK Red Head PLUGS

Red Head
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Spark Plug Service



Big Boy
⅞"-18 ½" Ext. for Buick. Also
½"-½" Ext. for Overland etc.

Service as applied to the sale of Red Head Spark Plugs means that no matter where a user may be, any type or size of plug can be obtained during business hours, and, in thousands of garages, hardware stores and service stations at any time, day or night, holidays or Sundays.

This service is not confined to this country alone. Red Head Spark Plugs are known the world over, and the users of these plugs in foreign lands have had equally satisfactory results as have been realized in America.

That this service exists is due primarily to the development of a demand for Red Head Vitritone Spark Plugs by users who have spark plug knowledge and have insisted that they have what they know to be the

Best Spark Plug Made

This service is one of the greatest assets of the Red Head Spark Plug Corporation. But this organization would be utterly unproductive were it not that the quality of the plugs has been made even better than was ever before produced.

We are not dealing with promises, but with facts that have been clearly established and which are known to all dealers and users.

There is nothing "just as good" and there cannot be a substitute that will measure up to Red Head Vitristone standards of quality.

Unless we can satisfactorily demonstrate this by actual service we cannot expect to deserve the business that we confidently look forward to. We have supreme faith in quality and by the same token we have the same confidence in our resources to serve you.

(Continued)

Red Head Spark Plug Corp.
261 Broadway,
New York.

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SPARK Red Head PLUGS

Red Head

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Spark Plug Sales Helps

Business is largely influenced by observations of buyers and known quality stock is often sold by casual display. The sales department has developed a series of sales helps for dealers which will simplify transactions and greatly promote the sales of Red Head Vitristone Spark Plugs.

These include metal street signs, attractive signs for window display and trimming, and a handsome steel cabinet for showing the principal types and sizes of plugs generally used, with space for a stock sufficient for ordinary trade requirements.



Display Cabinet.

On the display tablet of the cabinet is mounted a Red Head Vitristone Spark Plug to meet every motor requirement, and an index specifying the type and size of plug for all well-known cars. The plugs and index are behind a glass front. The transaction is at the cabinet, the buyer selecting by index, having the most satisfactory service with no loss of time of the clerk, for the stock is always in order.

This cabinet is a handsome store ornament and may be placed conspicuously. It is steel, lithographed in red, is sightly and is a business builder.

In addition we have inaugurated a great publicity campaign to promote business for Red Head dealers. This will be systematic and constant—it will produce results.

The sales department is developing new store advertising features, that will attract and influence sales. It is issuing splendid literature for dealer distribution.

We are cooperating with dealers to promote business and are willing to go to extremes in this direction.

Dealers, let us show you how we can develop your spark plug sales. Users, if you are not a Red Head Booster you have never used our Red Head Vitristone Plug.

DO IT NOW!

(Continued)

Red Head Spark Plug Corp.
261 Broadway,
New York.

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SPARK Red Head PLUGS

Red  Head
TRADE MARK REG U.S. PAT. OFF.

Spark Plug Deliveries

Every business man keenly realizes the importance of obtaining stock as quickly as is practically possible after ordering. No matter what the quality or the value from the viewpoint of the dealer unless orders can be filled he cannot consider giving them. Buyers rarely purchase until the need is realized and expect that any concern doing a legitimate business will have sufficient stock to serve any reasonable demand.

Shortage of stock may be regarded as an explanation, but it does not serve customers and it does not encourage them to await the receipt of orders. The incident may be unfortunate for the user and a disappointment for the dealer, but it is a decided business disadvantage for the manufacturer who has merely failed when failure meant not only immediate loss, but no doubt future losses.

Orders Filled Upon Receipt

Is the purpose our Sales Department. Our organization has been systematized with the object of quickening the dispatch of all goods, and the Packing and Shipping Department have sufficient forces to keep pace with any demand.

The stock of plugs of all types and sizes in the stock rooms is sufficiently large to justify the statement that no order will be delayed, no matter what the proportions, and that so far as is humanly possible will be filled the same day as received.

This statement is made to emphasize the fact that any dealer can assure buyers of Red Head Vitristone Spark Plugs that they can depend upon HIS service in the same ratio that he depends upon Red Head service.

RED HEAD SPARK PLUG CORPORATION

261 Broadway **New York City**

FACTORIES:
New York City
and Newtown, Pa.

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Mormiles

TRADE MARK

Makes Your Motor Self-Cleaning

Adds Mileage

Mr. J. Newton Roe, Prof. of Chemistry, Chicago, Ill., says: I take great pleasure in recommending "Mormiles Tablets" as in my personal experience with a high powered car, I increased my mileage 27% by using them.

I also find in analyzing these tablets, that there is nothing in them to injure the finest motor, or in any way interfere with the working of the carburetor.

In Red Cans Only



Increases Power

Garrett, Ind.,
March 31, 1919.

Mormiles Company,
226 So. La Salle St.,
Chicago.

Gentlemen:

Enclosed find check No. 3579 for $8.00. Forward us by mail 1 dozen dollar size boxes of Mormiles "Pills."

My fellows down here seem to think they cannot run without them.

Yours respectfully,
Rollins & Elson.

Here is a gasoline intensifier and carbon eliminator ***of real merit,*** guaranteed not to injure the mechanism of the finest motor, carburetor or vacuum-feed system.

Mormiles energizes weak, logy, low-grade gasoline; improves lubrication; gives uniform combustion, perfect ignition, easier starting, quicker "pick up;" diminishes wear and tear on motor and insures longer life.

Mormiles will add 20% to 50% more miles per gallon; insure 30% more power; will free engine from carbon accumulations and "keep it clean as a whistle;" readily dissolves and is equally effective in gasoline, kerosene or distillate and becomes an integral, evenly distributed part of the fuel which passes out of the exhaust.

The Most Effectively-Beneficial Intensifier on the Market

Enthusiastic, unsolicited letters are coming in every day. Write for them. Hear the really remarkable results obtained. *Mormiles* promises to be of universal service to automobile and tractor owners.

SOLD ON MONEY-BACK GUARANTEE. 100 tablets—enough for 100 gallons of gasoline—$1.

Jobbers and Dealers:
Mormiles is coming strong. Nothing can stop it. Get in early. Write us for attractive proposition.

This coupon worth $1. Use it today.

Mormiles Co., 226-8 S. La Salle St., Chicago. 99
Enclosed find $1 for two regular $1 cans of Mormiles, a special offer for introductory purposes only—where dealer cannot supply.

Name .....

Address .....

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PRESSMAN

Liberty Tires



Omar Tires

EVERYWHERE

Longest Service When Measured by the Price You Pay

OMAR and LIBERTY tires are made and sold to a definite policy—highest quality obtainable and a guarantee of service.

It means absolute satisfaction to users. OMAR and LIBERTY tire dealers will advise you that these tires will deliver full service mileage and the purchaser will receive full value.

There is no condition, no uncertainty. The tires must afford 100 per cent. service.

Measured by first cost and by mileage guarantee OMAR and LIBERTY tires are unequaled; the saving in any event is such they are the most economical tires to use.

Back of this guarantee is the manufacturer. Unless the tires satisfy he is the loser. Only by maintenance of the highest quality can his prestige and the business of his distributor endure.

Compare these tires and the prices with all others. Contrast the guarantees. Consider the service of each. Then you will equip with either OMAR or LIBERTY tires.

Then you'll understand fully what you get for what you pay and what a positive guarantee means to you.

DEALERS: OMAR and Liberty production is rapidly increasing. We can offer a limited number of splendid dealer contracts. The trade discounts are liberal. You can meet any competition and make more than good profits.

Correspondence invited. Full information at request.

PRESSMAN TIRE COMPANY

PHILADELPHIA PENNSYLVANIA

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Your Tire Valves

The object of a tire valve is to retain the air that has been pumped into the tire.

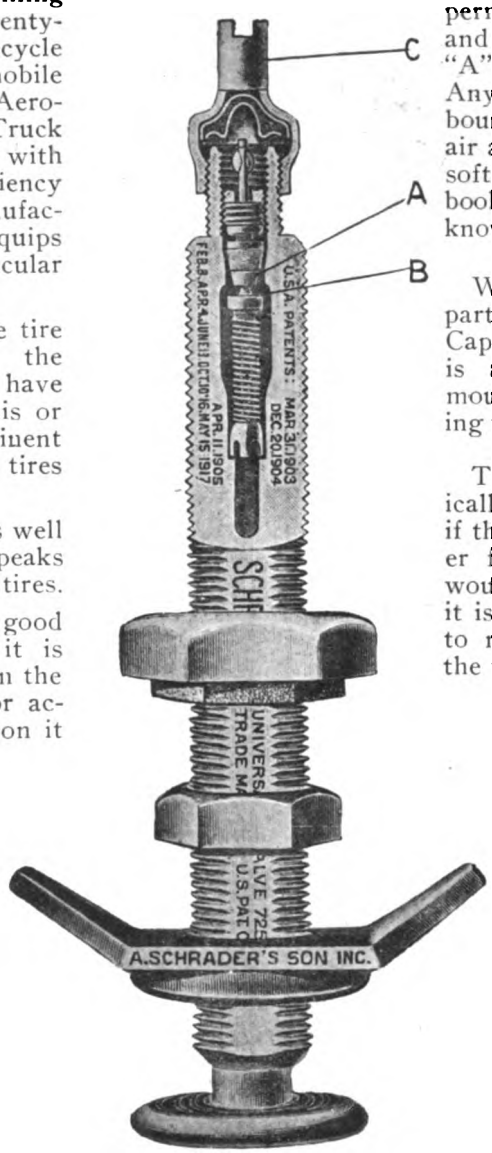
The SCHRADER UNIVERSAL VALVE has been fulfilling this object for more than twenty-five years; first with Bicycle Tires and later with Automobile and Motorcycle Tires, also Aeroplane Tires and Heavy Truck Tires, and it has done this with such thoroughness and efficiency that today every Tire Manufacturer in the United States equips his tubes with that particular valve.

On frequent occasions the tire makers, justly proud of the achievements of their tires, have published the fact that this or that car had crossed the continent "with the same air in the tires with which they started."

Such a performance speaks well for the tires, but it also speaks well for the valves on those tires.

Obviously, a tire is only as good as the valve with which it is equipped, and the best tire in the world will give a very poor account of itself if the valve on it leaks.

There have been none to question the ability of the SCHRADER UNIVERSAL VALVE to act properly as a retainer of air; every year some little refinement has been added to further improve it, until today it is recognized by Tire Manufacturers as the only valve doing justice to their tires and offering the guarantee of perfect service which they require.



It is not enough, however, for a tire valve to be perfect. It must remain perfect. Unfortunately, it cannot remain perfect if dirt or dust or foreign substances are permitted to enter the valve-stem and lodge between the valve-seat "A" and the rubber washer "B." Any obstruction at this point is bound to cause a slow escape of air and an eventual soft tire—and soft tires are hard on the pocketbook as all experienced Motorists know to their sorrow.

We urge you, therefore, to pay particular attention to your Valve Cap "C" and to make sure that it is always put back over the mouth of the valve after pumping the tire or testing its inflation.

The cap in itself would hermetically seal the air within the tire if there were no plunger or washer further down; however, this would not be a practical valve as it is necessary to have a plunger to retain the air when inflating the tire.

The Cap is the second absolutely air-tight closure of the SCHRADER UNIVERSAL VALVE and in addition to this it is a protection to the valve-plunger by keeping dust, mud or foreign matter of every kind from entering the valve-stem.

Keep this foreign matter out by screwing your valve cap down firmly over the mouth of the valve and you will never know what a leaky valve is.

A. SCHRADER'S SON, Inc.

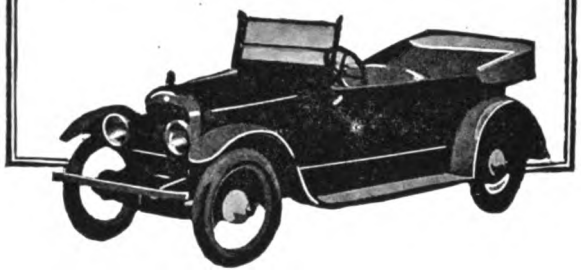
800 Atlantic Avenue **Brooklyn, N. Y.**

LONDON **CHICAGO** **TORONTO**

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COSTLY PAINTING PREVENTED

REFINISH YOUR CAR



Preserve the finish on your car, the Original Varnish on your car won't last forever—use Panvar and keep your car in respectable condition—to ride in a shoddy, dull, worn, second-hand looking car is downright foolishness, when you can give your car that shipping date appearance in a couple hours time, for about $3.00 and add $300 to the looks of your car and not lay up the car a single day.

Panvar
TRADE MARK

Self-Leveling Laque

WHAT PANVAR IS

A lustrous, lasting, transparent liquid to take the place of varnish, beats varnish in lustre, lasts quite as long, is self-levelling, not said to be, *but actually is*, for Panvar is as thin as water, so it can level itself and not show brush streaks, but when it dries it dries harder than varnish—free from stickiness, can be used on the metal, wood, seats, tops and plated parts—of itself Panvar cannot turn white, creamy or craze—it's a lasting, livening up preparation that has varnish beaten in a hundred ways—ANY NOVICE FOLLOWING SIMPLE INSTRUCTIONS CAN APPLY WITH ASSURANCE OF SUCCESS. PANVAR is prepared for cars where ground paint is in good condition, but varnish has become dull, worn, or needs livening up. Such cars can be made to look like new in an hour's time.

FIX-A-MAR COLORS IN TUBES

If there are bruised places in the ground coat of paint, buy a tube of our FIX-A-MAR color to touch up the marred parts, at $1.00 per tube delivered. SEND STAMPS FOR COLOR CARD.

TWO QUARTS ENOUGH FOR LARGE CAR

If finish is much worn, two coats may be necessary. Easy proposition for anyone, so why neglect your car, or pay a big price for an expensive repainting job.

SEND $1.50 for ONE, 3.00 " TWO, 5.50 " FOUR **QUART**

WE PAY PARCEL POST CHARGES

Add 25c. per quart to points west of Rockies

SMALL TEST SAMPLE 25 CENTS

EXCLUSIVE HOUSE TO HOUSE DISTRIBUTING AGENTS WANTED, PROFITABLE WORK AND TERRITORY

MOTORISTS' DIRECT ORDER COUPON 7-19

THE PANVAR CO. 618 Bulletin Bldg. Philadelphia, Pa.

Send by express or parcel post paid.....quarts

Name.....

Address.....

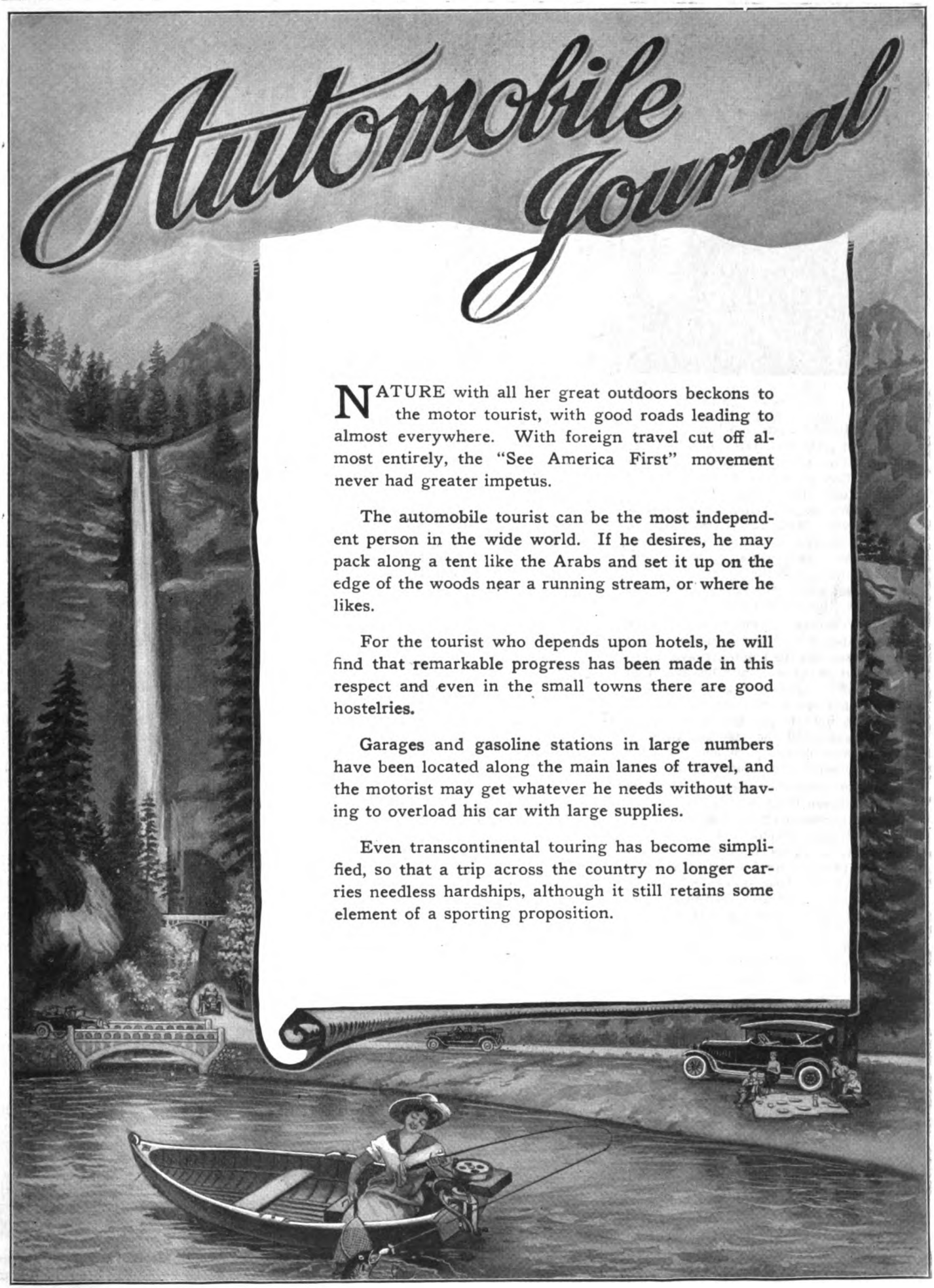
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NATURE with all her great outdoors beckons to the motor tourist, with good roads leading to almost everywhere. With foreign travel cut off almost entirely, the "See America First" movement never had greater impetus.

The automobile tourist can be the most independent person in the wide world. If he desires, he may pack along a tent like the Arabs and set it up on the edge of the woods near a running stream, or where he likes.

For the tourist who depends upon hotels, he will find that remarkable progress has been made in this respect and even in the small towns there are good hostelries.

Garages and gasoline stations in large numbers have been located along the main lanes of travel, and the motorist may get whatever he needs without having to overload his car with large supplies.

Even transcontinental touring has become simplified, so that a trip across the country no longer carries needless hardships, although it still retains some element of a sporting proposition.

Complete Index Starts on Page 39.

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Type of Lincoln Highway Road in State of Pennsylvania.

MOTORISTS using the Lincoln Highway between New York and the Pacific coast will find many detours on this great artery of traffic during this year. More than $12,000,000 will be expended in permanent Lincoln way improvement. Many states have decided upon the greatest highway construction program ever undertaken in the history of the country, and the work in rebuilding the highway has started in many of the 96 counties traversed.

Every effort will be made by the various state highway departments to select the best and shortest detours available; keep them in good condition and well marked. The Lincoln Highway Association is supplying a standard official red, white and blue temporary detour sign. These signs will be erected in each county where detours are necessary for the convenience and comfort of tourists.

Since the inception and announcement of the Lincoln Highway in 1913 this transcontinental road has had a wonderful growth and development. There remains a tremendous amount of work to be accomplished, but, nevertheless, the work which has been done enables any man to plan a transcontinental trip, knowing exactly what route he will follow, exactly through what cities he will go, and to determine in advance an approximate schedule of arrival at the different points, and to estimate with a degree of accuracy the length of time it will take him to complete his journey and what the expense of the trip will be.

No Hardships.

A journey from the Atlantic to the Pacific is still something of a sporting proposition, yet the tourists, although they must cheerfully put up with some unpleasantness, will meet no hardships or experiences which make the trip of undue severity, even to a woman. If the tourist encounters perfect weather entirely across the country, absolutely no difficulties may be considered. In fact, practically the only difficulties at present attendant upon a transcontinental drive over the Lincoln Highway are the result of unfavorable weather conditions.

This is due to the fact that so much of the road is yet natural dirt highway in Nebraska and Iowa, and while kept in condition by the constant endeavor of the local communities in dry weather, a season of unusual rainfall inevitably makes driving difficult. The motorist is advised to take as a precept the statement that when it rains in the middle west or west, the thing to do is to stop and not attempt to continue the journey until the rainy spell is over and the roads have had a day or two to dry up.

While it is possible to drive across the United States without encountering a single day of rain, it is highly improbable. The tourist can drive anywhere between New York and the Illinois-Iowa line either during or after heavy rainstorms without difficulty, but once west of this point it is wise to delay the trip, as many days as necessary, stopping comfortably at a hotel, if heavy rains are encountered.

The tourist driving the Lincoln Highway should consider the fact that many of the long stretches of perfect construction which he will pass over would have been, a few years ago, impassable bogs if wet or inches deep in dust if dry. As late as 1908 and 1909 transcontinental travel by motor was still an adventure for the intrepid and was undertaken almost solely by automobile manufacturers either as a test or advertising trip. The tourist of this year cannot appreciate, unless he attempted a similar drive over the transcontinental route four or five years ago, the vast extent of the improvement which has been accomplished.

Historic Interest.

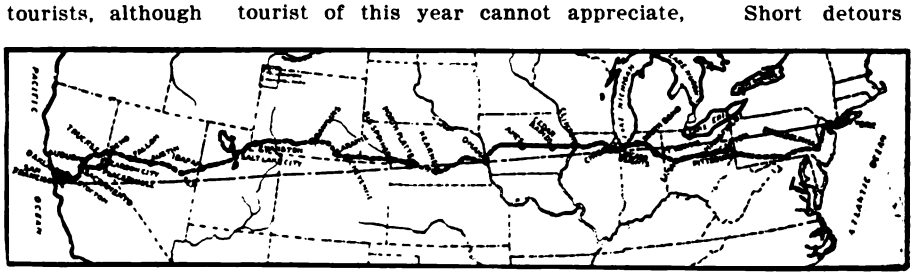
Beginning in New York, the Lincoln Highway passes through 11 and connects 12 states before it reaches the Golden Gate. Much of the highway passes through or near places of historic interest. From Trenton, Valley Forge, Gettysburg, to the scenes of the Indian fights and savage massacres along the line of the western pioneer advance, the highway links together our heroic struggle for independence, our way for national unity and the bloodstained steps of our emigrant progress from the Mississippi across the plains and mountains to the western sea. Moreover, from the branches stretching out on each side of this highway one can visit most of the spots where American history at its various periods reached its climaxes.

Across New Jersey the Lincoln Highway is macadam entirely, but due to the tremendous traffic which it has carried, especially the motor truck trains carrying government supplies to Atlantic coast points, sections have suffered deterioration. Improvement of these sections, however, is under way. State Engineer George W. Goethals has advocated construction of a more permanent type of pavement.

The Lincoln Highway is smooth, well kept macadam, approximately 400 miles across Pennsylvania through the Allegheny mountains. In the state there are only about 14 miles of Lincoln Highway unimproved.

Short detours may be necessary in Ohio because of improvement being made in the highway. Each of the 13 counties of the state traversed by the highway is rushing permanent construction.

In crossing the entire State of Indiana



The Lincoln Highway.

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less than 20 miles of really bad roads are encountered. There are long stretches of brick and concrete highway. In dry weather the trip across Illinois, Iowa and Nebraska can be made over well-graded, dragged and drained dirt roads, but in the latter two states especially rain furnishes a barrier to all traffic.

Sections of the highway in Wyoming gave way under the exceptionally heavy traffic, but the State Highway Department, with the aid of the county authorities all along the line, has rushed adequate repairs to take care of this year's traffic.

That part of the Lincoln Highway known as the desert section is met in Utah and Nevada, and the drive from Salt Lake City to Ely should not be lightly attempted. The road becomes impassable under adverse weather conditions, but when dry the route can be traversed without serious difficulty. In California the roads are all the tourist could desire.

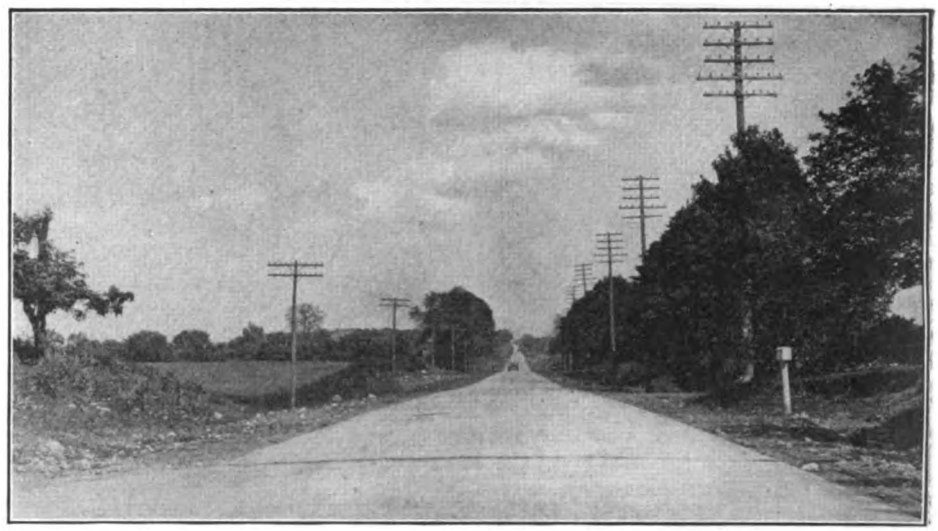
Highway 3322 Miles.

The distance from New York to San Francisco via the Lincoln Highway is 3322 miles. The usual pleasure party, with easy driving and only a nominal amount of sight-seeing at the different points, can make the trip in 20 to 30 days, driving approximately 10 hours per day. This means that approximately 18 miles per hour must be made during the driving time as an average.

Many long stretches can be covered at high speed, as the wide open stretches of the West, where little traffic is encountered, enable the driver to make with safety any speed of which the car is capable.

The entire expense of a car and four passengers from New York to San Francisco should not at any time exceed $5 a day per passenger under normal conditions, according to Field Secretary H. C. Ostermann of the Lincoln Highway Association. This sum will include everything except tire expense and unforseen accidents. Gasoline, oil and all provisions have been figured in this estimate, but not repairs to the car caused by breakage or wear. The expense of the trip can be increased to any figure, of course, by making use of high priced hotels in the larger cities for extended periods.

The rapid improvement of the Lincoln Highway, the national interest in it and the yearly increasing volume of transcontinental touring have tremendously stimulated the improvement of accommodations along the route. There are many hotels catering almost solely to the tourist. Even in the small communities the tourist will find good service. The development of adequate garage facilities has kept pace.



Road in St. Joseph County, Indiana.

Suggested Equipment.

The Lincoln Highway Association makes the following recommendations as to equipment:

Car equipment—Lincoln Highway sustaining membership radiator emblem, pair Lincoln Highway pennants; two sets tire chains, six extra cross chains, one set chain tightener springs, one set tools, two jacks, pair good cutting pliers, two extra tire casings, four extra inner tubes, casing patch, three spark plugs, eight feet high-tension cable, eight feet low-tension cable, extra valve and spring, complete; three cans oil in one-gallon cans, axe, shovel, upper radiator connection, lower radiator connection, one set lamp bulbs, motometer.

Optional camp equipment—Five-gallon milk can with stay straps (for water west of Cheyenne, Wyo.), two-quart canteen, 10-inch frying pan, 12x24-inch grate for camp fire, two-quart coffee pot, four large cups, four five-inch diameter pans, four knives, auto camp stove, six forks, six teaspoons, two cooking spoons, four soup spoons, dipper, eight eight-inch diameter plates, two stew pots (to nest), three-prong cooking fork, butcher type carving knife, three bars soap, six dish towels, can opener, bread pan (for fish washing), bucket with lid, can for pepper one dozen patent egg carrier, cork screw, air tight two-pound coffee can, air tight 1½ pound teacan.

Suggested personal equipment for each man—Lincoln Highway sustaining membership card, Lincoln Highway label button, waterproof (warm type) sleeping bag, waterproof 15x36-inch duffle bag (no suit case or satchel should be carried), pair light moccasins, two pair khaki or Duxbac riding trousers, two army officer's shirts (best quality for warmth), pair light weight shoes, pair heavy weight shoes (loose enough for heavy socks), two pair heavy wool socks, two suits heavy wool underwear, two suits light linen or cotton underwear (to wear under the wool or alone—don't wear wool next to skin), two bandana neck kerchiefs, six pocket handkerchiefs, three pair medium weight socks, teamster's canvas coat, slicker and flannel, lined and with a high collar; pair canvas puttees, stick camphor ice, two dozen cathartic tablets, package gauze, three rolls gauze bandages, 1½ inch wide; tube vaseline (for guns and burns), tooth brush; comb, knife (strong), two or three blades; pocket compass, safety razor, can shaving soap, powder; shaving brush, small mirror, needles and thread, package bachelor buttons, pair small scissors, two pair gauntlet gloves, leather belt, inexpensive open-face watch, 6x7 feet rubber sheet, pair yellow goggles, pair white goggles, square yard mosquito netting, camera, cap, can tooth paste.

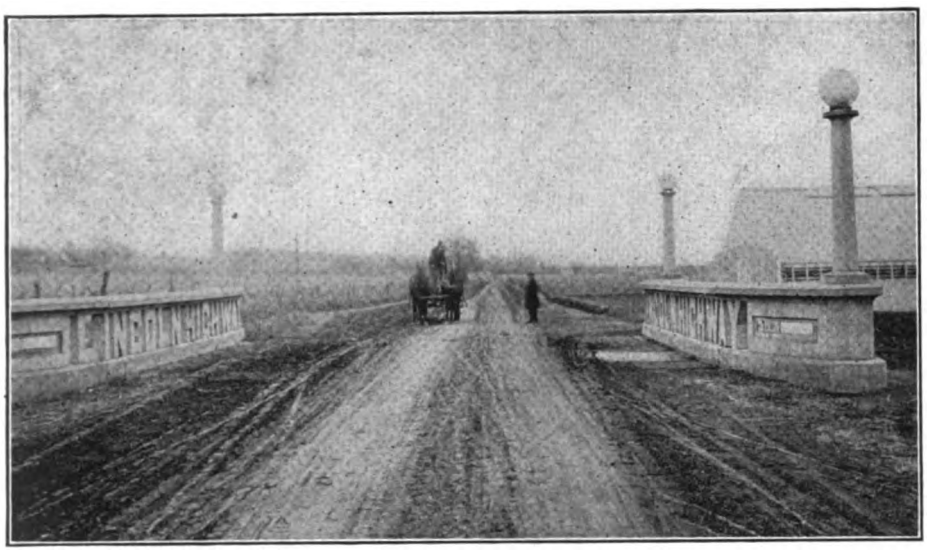
Provisions for Campers.

Suggested provisions for campers—Slap best bacon, three cans peaches, three cans pineapple, three cans tomatoes, three cans baked beans, one dozen eggs, four loaves bread, sack salt, can pepper, pound butter (not necessary), two pounds rice, 10 pounds potatoes, six



Through the Land of Agricultural Plenty—the Lincoln Highway in Nebraska.

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Arch Bridge on Lincoln Highway East of Tama, Ia.

cans small size evaporated milk, pound sugar, package (dozen boxes) safety matches, two pounds cracked wheat, pint pickles, box graham crackers, two pounds coffee (ground), ½ pound tea, roll surgeon's plaster one inch wide, five yards (for sealing cans, etc.), roll corn, three cans fresh fruit, often as possible.

It is not at all necessary to carry much food, as supplies can be obtained all along the route. It is best, however, to have some food in the car west of Salt Lake City. Camping out is not at all necessary.

Advice for Tourists.

Among the advice given to tourists by the Lincoln Highway Association is the following:

"Don't wait until your gasoline is almost gone before filling up. Always fill your tank at every point gasoline can be secured, no matter how little you have used from your previously supply.

"Don't allow your water can (west of Cheyenne, Wyo.) to be other than full of fresh water and fill it whenever you get a chance. You might spring a leak in your radiator, or burst a water hose,

"Don't allow the car to be without food of some sort at any time west of Salt Lake City. You might break down out in the desert and have to wait some time until the next tourist comes along.

"Don't buy oil in bulk when it can be avoided. Buy it in the one-gallon original cartons.

"Don't fail to have warm clothing in the outfit. The high altitudes are cold and the dry air is penetrating.

"Don't fail to put out your camp fire when leaving.

"Don't forget the yellow goggles. In driving west you face the sun all afternoon and the glare of the western desert is hard on the eyes.

"Don't forget the camphor ice. The dry air of the west will crack your lips and fingers without it.

"Don't drink alkali water. Serious cramps result.

"Don't wear new shoes.

"No extra gasoline need be carried, although it is advisable to have an extra tank for use in case of emergency, such as a leak in your gas tank or a break in your gasoline connections."

Western Feeder Roads.

The Lincoln Highway Association announces that in many of the inquiries coming to the association, concerning the transcontinental drive, advice is requested concerning the best road to follow for a side trip to Denver, Col. Motorists, both eastward and westward bound, will find it to their advantage to follow the Lincoln Highway proper to Cheyenne, Wyo., striking south from this point to Denver, a distance of 141 miles. This road is in good driving condition at practically all times. In Colorado it is a state highway.

The Denver-Yellowstone Highway leads from Denver to the southern entrance of the Yellowstone National Park, striking the Lincoln Highway at Laramie, Wyo., and following it to Rawlins, Wyo., and thence north to the southern entrance to the park by way of Lander and DuBois.

For the Lincoln Highway tourist desirous of visiting the Yellowstone National Park, a direct route to the eastern entrance is offered by means of the Yellowstone Highway which intersects the Lincoln Highway at Cheyenne, Wyo. The Yellowstone Highway leads north from Cheyenne via Wheatland, Douglas, Casper, Thermopolis, Basin and Cody, Wyo., to the eastern park entrance, a distance of a little more than 500 miles from Cheyenne.

The road running southwest from Ely, Nev., by way of Goldfield and Tonopah, into southern California and ending at Los Angeles, is one of the main line branches of the Lincoln Highway and the one probably most used by Lincoln Highway tourists. The road is known as the Midland Trail. It is a short cut from the Lincoln Highway into southern California, the distance from Ely on the Midland Trail to Los Angeles being 570 miles and the distance from Ely to San Francisco via the Lincoln Highway being 606 miles. Ely is the junction point for all traffic coming from northern and southern California and heading east, and the dividing point for all Lincoln Highway western travel seeking the Pacific coast.

Tioga Road.

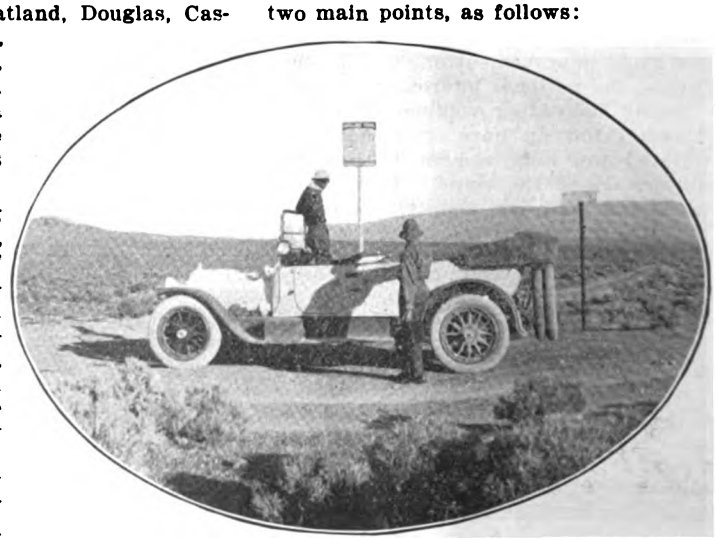
A trip through the Yosemite National Park may well be a part of the itinerary of the tourist westward bound upon the Lincoln Highway. At any time between the middle of July and the middle of September a practical route through the park is offered via the Midland Trail and the Tioga Road. The tourist may leave the Lincoln Highway at Ely, Nev., and travel south on the Midland Trail by way of Tonopah and Goldfield to Big Pine, leaving the Midland Trail at Big Pine and traveling north by way of Bishop to Monto Lake, crossing through the Yosemite Park and rejoining the Lincoln Highway again at Stockton, Cal., by way of the Tioga Road.

Jefferson Highway.

The Jefferson Highway intersects the Lincoln Highway about midway of its course, in Iowa. As it winds its way south from Winnipeg, the Jefferson traverses the rich area of the great glacial deposits in Manitoba, through Minnesota southward until it comes to the upthrust of the Ozark Mountains, then its trend is westward around the western spurs of these mountains, till it crosses the Red River into Texas, at Denison. From there it takes a southeasternly course through Louisiana, over the alluvial deposit of the Red and Mississippi rivers.

The Lincoln Highway Association publishes "The Complete Road Guide of the Lincoln Highway," which sells for $1.50 and which is very valuable to the Lincoln Highway tourist. The national headquarters of the association is in Detroit, Mich.

For convenience the route to San Francisco has been divided into 10 sections, each comprising the distance between two main points, as follows:



At a Western Cross Roads.

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First—New York to Philadelphia, 93.6 miles.

Second—Philadelphia to Pittsburgh, 292.2 miles.

Third—Pittsburgh to Ft. Wayne, Ind., 321.9 miles.

Fourth—Ft. Wayne to Clinton, Ia., 319.7 miles.

Fifth—Clinton to Omaha, Neb., 387.7 miles.

Sixth—Omaha to Cheyenne, Wyo., 520.8 miles.

Seventh—Cheyenne to Salt Lake City, Utah, 483.5 miles.

Eighth—Salt Lake City to Ely, Nev., 288.4 miles.

Ninth—Ely, Nev., to Reno, Nev., 347.8 miles.

Tenth—Reno to San Francisco, 267.9 miles.

There is also a section No. 11 for the route from Reno to Sacramento, Cal., east and south of Lake Tahoe via Carson City, a distance of 168.4 miles.

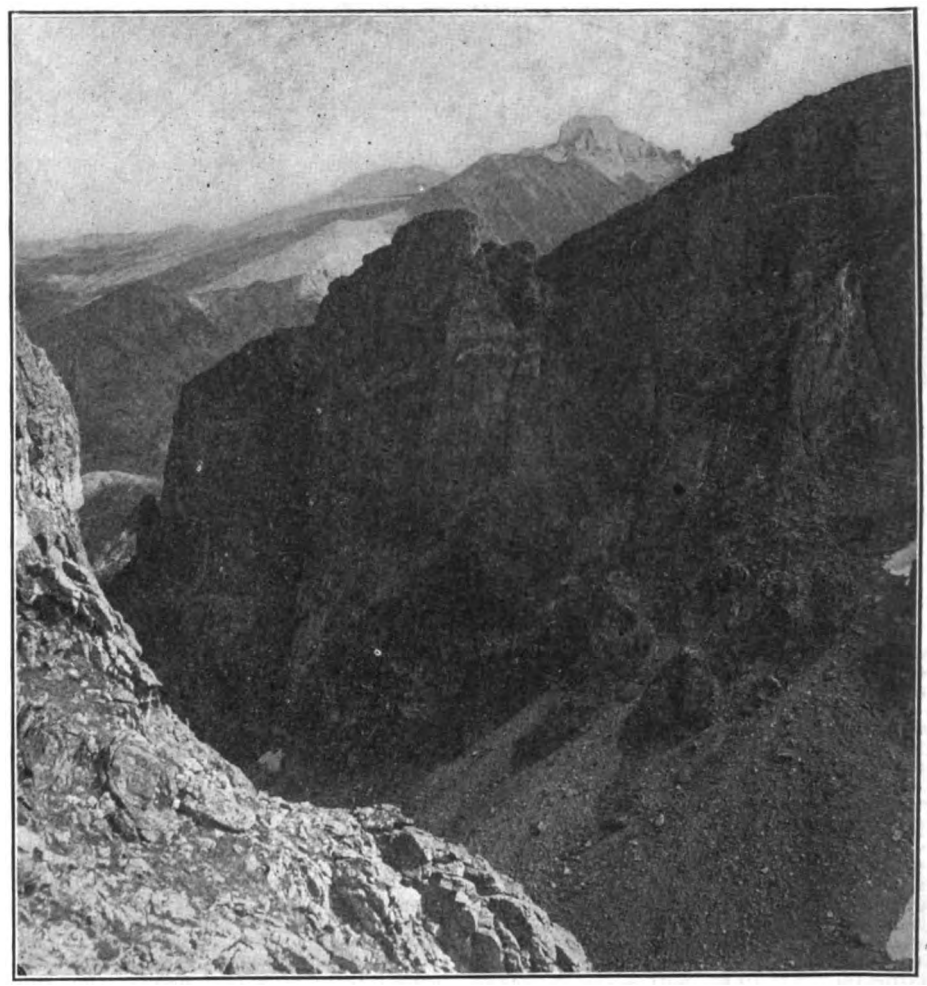
Notes for Tourists.

By A. L. WESTGARD.

A TRANSCONTINENTAL tour is now a comparatively easy matter provided the motorist carries along the necessary equipment. Until very recently a trip by automobile across the continent has been somewhat of a hazardous adventure, as well as an expensive and tiresome undertaking, often times requiring some degree of endurance, but fast improving road conditions on the established routes tend more and more to make the journey of unusual enjoyment and full of interest rather than a task to be accomplished by laborious effort.

Formerly it was advisable to carry all kinds of emergency tools on a transcontinental trip, and also a fairly complete camping outfit; but, with the steady increase in cross-country motor travel, better accommodations have been provided in the various towns and in practically every village along the main highways, the tourist can secure all necessary supplies. It is still recommended, however, to be provided with a shovel, axe, 100 feet of five-eighths inch rope and a tarpaulin. The likelihood of some mud east of the Rocky mountains makes this equipment a probable necessity. A couple of desert water bags should be secured in the arid country and may be hung at some place on the car, so that evaporation of the water which soaks through the canvas will cool the contents. Fill them with soft water at every opportunity.

Load the car light. Do not carry a quantity of unnecessary baggage. Remember you can find plenty of gasoline along the main traveled routes and it is not necessary to carry an extra supply. Fill your tank at every station, whether empty or not, and you will always have a sufficient supply of gas to reach the next place. Of course, it is best to carry a few parts for the car and each car should start out with new casings all around, and a couple of spares, all the same size if possible, with the addition of a few good inner tubes. If you have bad luck with blow-outs, new casings can be purchased in most any town along the route and usually at standard prices.



View Looking Across Mount Halley to the Western Side of Longs Peak in Rocky Mountain National Park.

Plenty of warm clothing should be taken along. It is not necessary to carry any cooking utensils unless you are camping out, in which case, of course, bedding must be added to the equipment. Remember you can find a stopping place every night. It is a good plan to carry emergency rations, such as chocolate bars and seeded raisins.

For those expecting to camp out a considerable part of the way, additional equipment will be called for. In such cases we suggest a light automobile tent with ground cloth attached and a collapsible aluminum pole, a camp lantern, and an aluminum cooking outfit, two blankets per person, with pillows. Various kinds of auto camping outfits are being manufactured and these can be purchased at a comparatively small cost. As there are opportunities for hunting and fishing, a rifle or shotgun and fishing tackle are optional equipment.

ITINERARY.

Night Stops—Philadelphia, Gettysburg, Bedford, Pittsburgh, Pa.; Canton, Lima, O.; South Bend, Ind.; Chicago, Ill.; Clinton, Marshalltown, Ia.; Omaha, Kearney, Neb.; Julesburg, Denver, Col.; Cheyenne, Rawlins, Green River, Wyo.; Salt Lake City, Kearney's Ranch, Utah; Ely, Austin, Reno, Nev.; Sacramento, San Francisco, Cal.

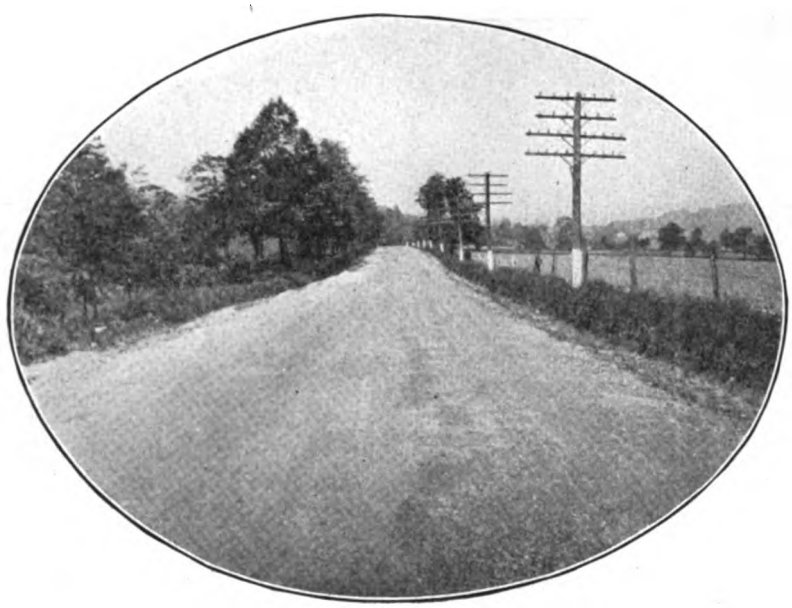
NEW YORK-PHILADELPHIA.

	Miles		Miles
New York	0.0	Franklin Park	41.8
Weehawken (via ferry)	3.7	Kingston	48.3
Jersey City	8.0	Princeton	51.5
Newark	12.2	Lawrenceville	56.4
Elizabeth	17.1	Trenton	62.5
Rahway	23.0	Oxford Valley	68.7
Iselin	27.0	Glen Lake	70.6
Menlo Park	28.0	Langhorne	71.6
Metuchen	29.8	La Trippe	76.6
New Brunswick	35.1	Busleton	81.7
Highland Park	36.4	Philadelphia	93.6

PHILADELPHIA-PITTSBURGH.

	Miles		Miles
Philadelphia	0 0	W. Fayetteville	137.4
Overbrook	6.4	Chambersburg	141.1
Ardmore	8.4	St. Thomas	148.5
Bryn Mawr	9.7	Fort Loudon	154.5
Wayne	14.1	McConnellsb'g	162.6
Berwyn	17.1	Harrisonville	169.0
Paoli	20.4	Breezewood	180.5
Whiteford	29.4	Everett	188.9
Dowington	32.5	Mt. Dallas	190.0
Thorndale Sta'n	34.6	Bedford	197.8
Coatesville	38.8	Wolfsburg	200.5
Sadsburyville	42.8	Schellsburg	207.1
Mt. Vernon	47.0	Buckstown	218.8
Gap	49.5	Kanter P. O	222.8
Kinzers	51.8	Stoyestown	223.8
Leaman Place	55 2	Farrilton	229.8
Paradise	56.7	Jenners	230.3
Soudersburg	60.7	Jennerstown	231.3
Lancaster	65.0	Laughlintown	239.8
Mountville	71.4	Ligonier	243.1
Columbia	75.1	Youngstown	251.7
Wrightsville	76.9	Greensburg	261.6
York	88.0	Grapeville	265 7

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Road in Lancaster County, Pa.

Abbottstown	102.9	Adamsburg	268.4
New Oxford	106.8	Irwin	271.2
Gettysburg	116.6	Jacksonville	272.5
Seven Stars	120.5	E. McKeesport	278.7
McKnightst'wn	122.4	Turtle Creek	281.0
Cashtown	124.3	E. Pittsburgh	282.1
Grafenburg	129.2	Wilkinsburg	284.9
Calendonia P'k	131.2	Pittsburgh	292.2
Fayetteville	135.6		

PITTSBURGH-FORT WAYNE.

	Miles		Miles
Pittsburgh	0.0	Massillon	109.5
Bellevue	5.8	W. Brookfield	111.6
Avalon	6.6	E. Greenville	113.9
Glenfield	10.4	Dalton	118.6
Sewickley	17.2	East Union	124.8
Fairoaks	18.5	Wooster	130.8
Ambridge	21.0	Jefferson	134 8
Economy	21.8	New Pittsb'rgh	140.2
Baden	25.0	Rowsburg	143.5
Conway	26.4	Ashland	150.7
Freedom	28.2	Mansfield	164.2
Rochester	30.1	Ontario	171.0
Bridgewater	30.8	Galion	179.2
Beaver	31.4	Bucyrus	193.0
Esther	41.7	Nevada	201.0
Ohioville	43.0	Up. Sandusky	209.0
Smith's Ferry	46.0	Forest	222.2
E. Liverpool	50.6	Dunkirk	230.1
Lisbon	66.4	Dola	233.9
Hanoverton	75.9	Ada	240 8
Kensington	77.0	Lima	258.5
E. Rochester	81.7	Gomer	268.1
Minerva	85.7	Delphos	276.4
Robertsville	91.5	Van Wert	289.2
Osnaburg	97.0	Fort Wayne	321.9
Canton	101.8		

FORT WAYNE-CLINTON.

	Miles		Miles
Fort Wayne	0.0	Chic. Heights	154.9
Churubusco	13.6	New Lenox	172.0
Merriam	22.'	Joliet	178.1
Wolf Lake	25.6	Plainfield	187.7
Kimmell	30.4	Aurora	200.7
Ligonier	36.4	Mooseheart	205.6
Benton	46.7	Batavia	209.6
Goshen	53.8	Geneva	212.6
Elkhart	62.0	De Kalb	234.9
Osceola	68.0	Malta	239.8
Mishawaka	72 1	Creston	245.0
South Bend	76.1	Rochelle	251.7
New Carlisle	91.7	Ashton	263.1
La Porte	103.7	Franklin Grove	267.7
Westville	115.5	Dixon	277.0
Valparaiso	126.5	Sterling	290.2
Deep River	134.5	Morrison	304.9
Merrillville	141.5	Fulton	316.4
Schererville	147.3	Clinton	319 7
Dyer	150.3		

CLINTON-OMAHA.

	Miles		Miles
Clinton	0.0	Ames	197.6
DeWitt	19.5	Ontario	199.3
Grand Mount	25.0	Jordan	207 9
Calamus	31.0	Boone	213.7
Wheatland	35.2	Ogden	223.3
Lowden	41.2	Grand Junction	235 3
Clarence	49.7	Jefferson	243.6
Stanwood	54.4	Scranton	253.6
Mechanicsville	60.0	Glidden	265.1
Lisbon	66.9	Carroll	284.1
Mt. Vernon	68.6	West Side	296.4
Marion	81.5	Vail	302.2
Cedar Rapids	86.7	Dennison	311.2
Belle Plaine	122.2	Arion	319.1
Chelsea	129.0	Dow City	321.8
Gladstone	135.8	Dunlap	329.9
Tama	140.0	Woodbine	341.4
Montour	148.3	Logan	352.0
Le Grand	152.5	Missouri Val.	360.7
Marshalltown	162.2	Loveland	365.0
LaMoille	169.6	Honey Creek	369.8
State Centre	176.3	Crescent	375.6
Colo	183.7	Council Bluffs	383.1
Nevada	190.7	Omaha	387.7

OMAHA-CHEYENNE.

	Miles		Miles
Omaha	0.0	Gothenburg	259.3
Elkhorn	16.2	Brady	272.4
Waterloo	19.5	Maxwell	281.3
Valley	23.0	North Platte	293.9
Fremont	34.9	Hersey	307.0
Ames	42.8	Sutherland	314.4
North Bend	50.9	Paxton	327.4
Rogers	58.1	Roscoe	339.7
Schuyler	66.5	Ogallala	347.1
Richland P. O.	74.9	Brule	357.5
Columbus	83.1	Megeath	362.2
Duncan	92.3	Big Springs	368.0
Silver Creek	102 5	Chappell	389.8
Clarks	113.6	Lodge Pole	399.1
Central City	124.5	Sunol	405.9
Chapman	134.7	Sidney	417.1
Grand Island	147.5	Brownson	426.2
Alda	155.3	Potter	435.6
Wood River	164.8	Dix Station	444.6
Shelton	174.0	Kimball	454.1
Gibbon	180.0	Bushnell	466.0
Kearney	192.7	Pine Bluffs	476.0
Odessa	201.8	Egbert	486.1



Elm Creek	208.7	Burns	492.6
Overton	217.9	Hillsdale	500.4
Lexington	229.1	Archer	511.8
Cozad	247.1	Cheyenne	520.8

CHEYENNE-SALT LAKE CITY.

	Miles		Miles
Cheyenne	0.0	Latham Station	212.2
Corlett Station	5.7	Wamsutter	220.2
Borie Tower	9.3	Tipton Station	236.5
Otto Station	14.2	Point of Rocks	265.2
Granite Canyon Station	18.7	Thayer Junct'n	272.5
Buford	27.2	Rock Springs	281.7
Sherman Hill	32.8	Green River	296.5
The Siding	39.2	Bryan Station	309.8
Laramie	57.0	Granger June'n	325.6
Bosler	76.4	Lyman	354.2
Lookout	85.1	Ft. Bridger	359.8
Harper	90.6	Evanston	395.2
Rock River	96.8	Wyuta Station	398 2
Medicine Bow	116.8	Wasatch	405.1
Carbon	127.0	Castle Rock	413.4
Evansville	135.3	Emory Station	420.3
Hanna	138.5	Main Forks	429.3
Walcott	155.5	Coalville	441.2
Ft. Steele	163.1	Hoytsville	444.3
Lakota	169 6	Kinball's R'nch	459.1
Granville	173.4	Roach's Ranch	460.2
Rawlins	178.7	Salt Lake City	483.5
Creston Station	208.2		

SALT LAKE CITY-ELY.

	Miles		Miles
Salt Lake City	0.0	Orr's Ranch	87.3
Pleasant Green	15.0	County Well	104.2
Ragtown	16.1	Fish Springs	146.2
Garfield	20.3	Callao	166.6
Lake Point	28.1	Ibapah	192.2
Milltown	30.3	Tippett	215.8
Grantsville	40.3	Anderson's R'h	237.3
Timpie Point	54.3	Shellbourne	244.9
Iosepa	70.2	Magnuson's R'h	264.9
Brown's Ranch	77.3	McGill	273.6
Indian Ranch	79.3	East Ely	285.4
Indian Farm	84.3	Ely	288.4

ELY-RENO.

	Miles		Miles
Ely	0 0	Austin Summit	151.9
Lane	2.4	Austin	154.0
Copper Flat	6.9	New Pass Canyon	181 5
Reipetown	8.0	Kimberly	8.7
Alpine Ranch	190.7	Jake's Summit	16.2
Eastgate	214.3	Mooreman's R'h	30.7
Westgate	224.1	Rosevear's R'h	32.7
Mountain Well	249.3	White Pine Summit	38.7
Stillwater	264.2	Fallon	278.7
Hamilton	44.2	Hazen	295.6
Six Mile House	50.0	Fernley	308.1
14 Mile House	69.8	Wadsworth	311.3
Pinto House	76.4	Derby	316.8
Eureka	83.6	Vista Station	338.6
Rigley Ranch	96.9	Sparks	343.8
Grimes' Ranch	124.9	Reno	347.8

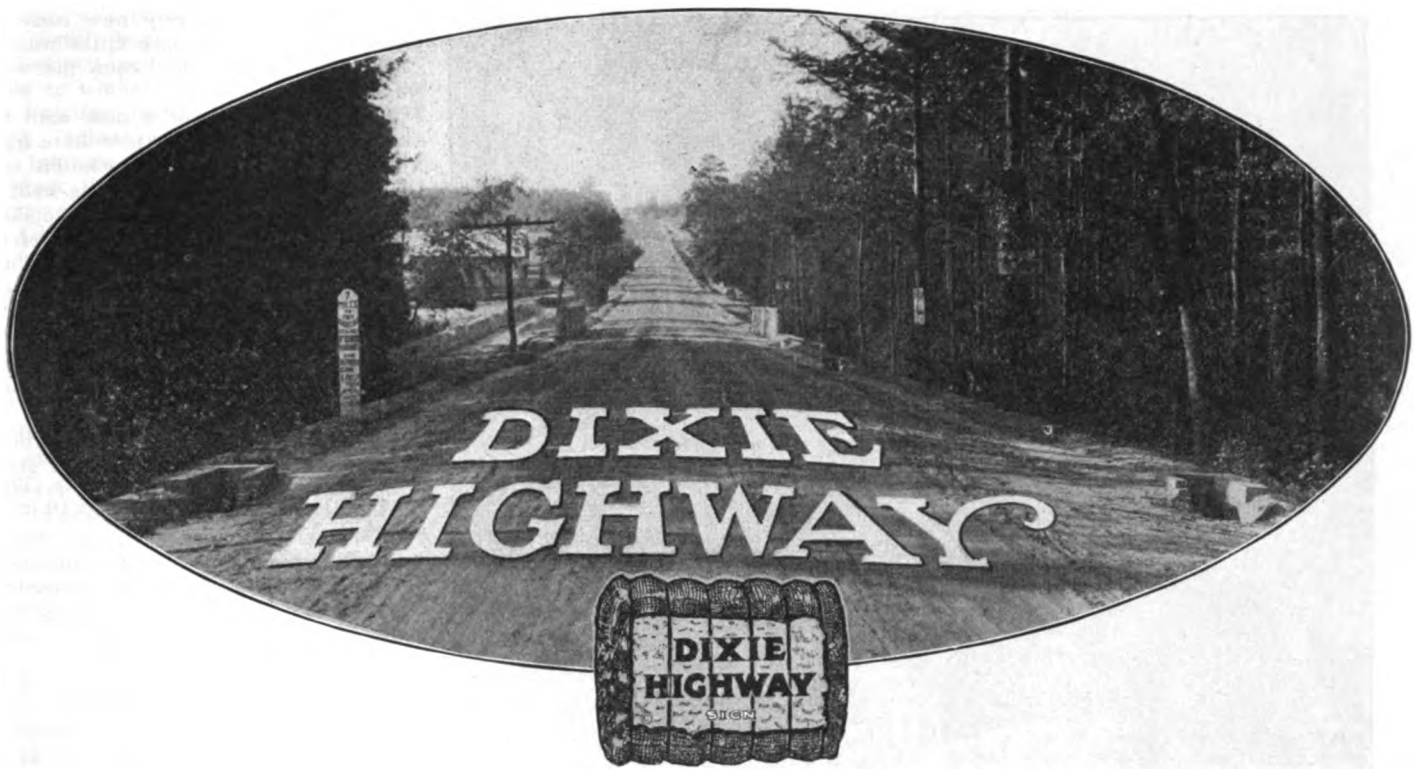
RENO-SAN FRANCISCO.

	Miles		Miles
Reno	0.0	Roseville	122.0
Verdi	10.7	Sacramento	139.7
Truckee	32 7	Elk Grove	152.7
Donner	37.7	McConnell	157.7
Emigrant Gap	62.7	Arno	159.7
Dutch Flat or Alta	75.8	Galt	165.7
Gold Run	79.0	Woodbridge	173.7
Colfax	89.0	Stockton	187.7
Wyman	92.2	French Camp	192.8
Applegate	95.0	Banta	204.4
Auburn	104.5	Altamont	221.9
New Castle	109.3	Tracy	208.1
Penryn	112.6	Livermore	229.7
Loomis	114.4	Hayward	257.2
Rocklin	117.0	Oakland	263.9
		San Francisco	267.9

RENO-SACRAMENTO.

	Miles		Miles
Reno	0.0	Sportsman's Hall	106.6
Steamboat Spgs.	10 1	Camino	110.9
Washoe	15.1	Placerville	117.6
Franktown	20.1	Eldorado	125 0
Carson City	31.7	Shingle Springs	129.9
Glenbrook	47.1	Clarksville	137.5
Cave Rock	50.1	White Rock	141.0
Edgewood	56.7	Folsom	147.1
Lakeside Park	57.8	Natoma	148.3
Meyers	65.7	Mills	157.1
Sierra Nevada Summit	68.9	Mayhew	160.0
Phillips	71.4	Manlove	161.1
Strawberry	76.1	Perkins	163.2
Kyburz	85.8	Sacramento	168.4
Riverton	95.3		

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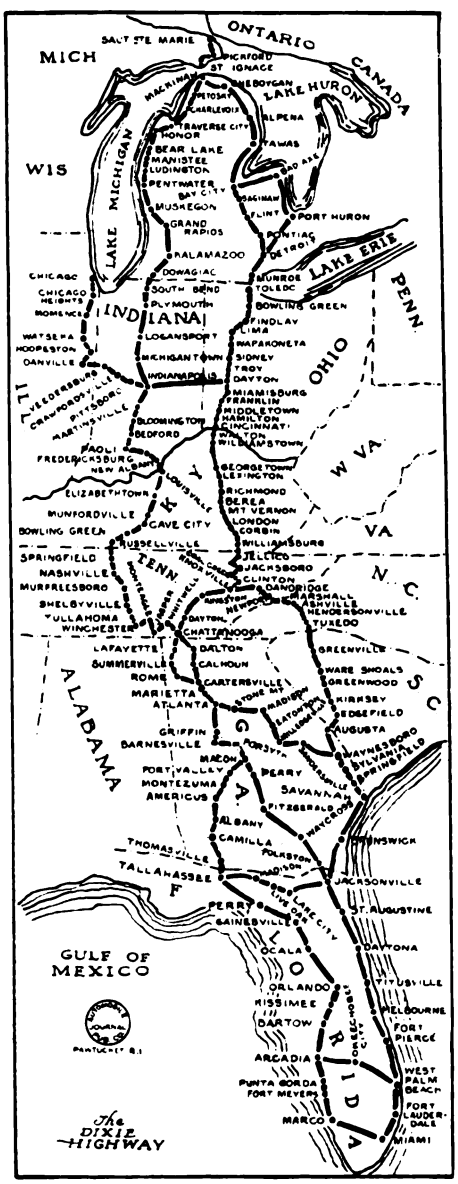


ENCIRCLING the great State of Michigan and tapping the rich industrial centers of Illinois, Indiana and Ohio, and passing southward to Florida, where it terminates at Miami after traversing the winter resorts of that state, the Dixie Highway is second only to the great transcontinental lanes. The total mileage of the Dixie Highway, with all its divisions and branches, is 5221 miles, traversing 171 counties of eight states.

Its main branches extend from Chicago and South Bend via Indianapolis, Louisville, Chattanooga, Atlanta and Jacksonville to Miami, and from Detroit via Toledo, Cincinnati, Lexington and Knoxville to Chattanooga, where the two divisions come together.

Branches of the Dixie Highway are crossed by the Lincoln Highway at Lima, O.; South Bend, Ind., and Chicago Heights, Ill. Throughout its entire length the highway system is backed and encouraged by an enthusiastic organization which has been responsible for its high state of development and progress.

Motor tourists and prospective tourists of northern states have been in the habit of looking longingly at Florida as the touring season rolled around, wondering when it would be possible to drive to the land of flowers with some degree of comfort. When the Dixie Highway movement was organized four years ago with the fan flare of trumpets attending the conference of governors of northern and southern states, motorists began to believe that they would soon have a great highway to the object of their desire. As each year rolled by and the more venturesome tourists came back, mostly by rail instead of impossible trails, they began to believe that the great projected highway between the North and South had been paved by its promoters, the Dixie Highway Association, with good intentions instead of the more durable surfacing of concrete, brick or even macadam.



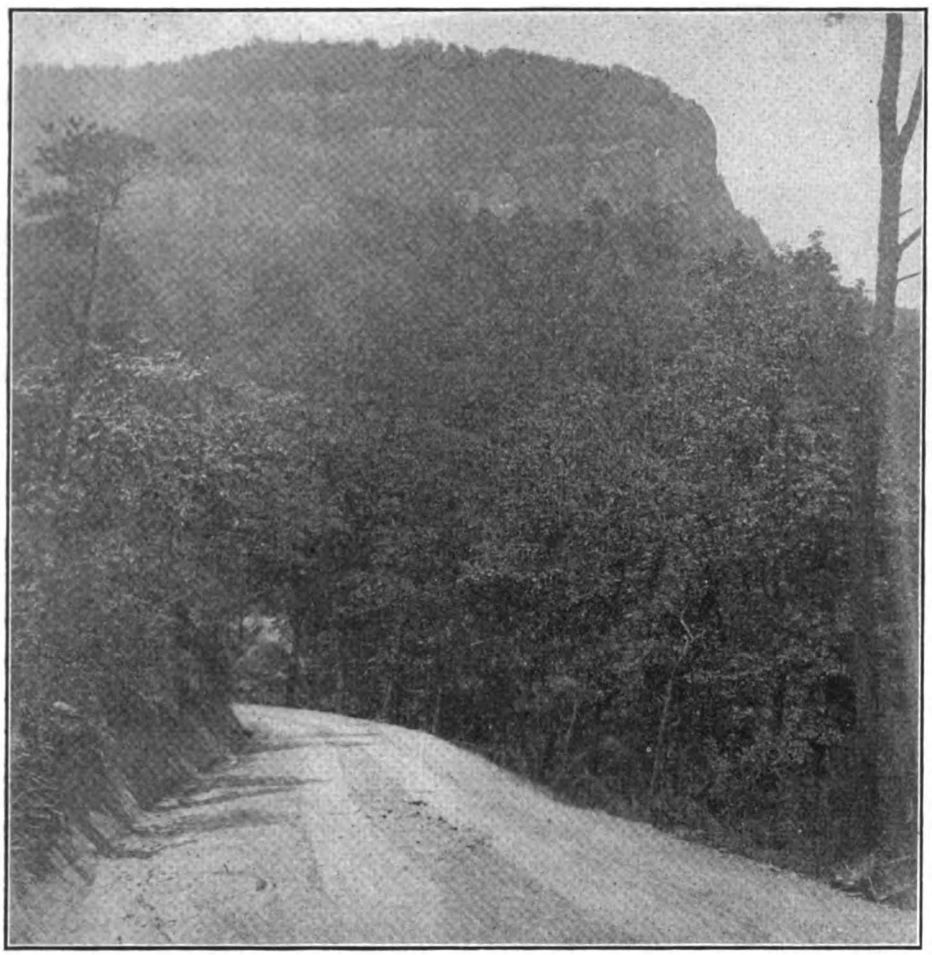
The Dixie Highway Association, be it known, has been working persistently in the mud and rocks of the Cumberland Mountains and the sands of southern Georgia and northern Florida and now comes forward with a definite promise to dedicate the eastern division of the highway from Cincinnati to Chattanooga via Lexington and Knoxville, on June 14, 1920. All of the financial arrangements for the construction of the remainder of 126 miles of the highway through the Cumberland mountains have been completed. Forces are at work in five of the counties and expect to complete a surfaced highway from Cincinnati to Knoxville within less than 12 months. When this is done one of the most picturesque routes in the United States will be open for tourist travel.

During the present summer touring season it will be possible for motorists to travel this division of the highway to Berea, Kentucky, in the foot hills of the Cumberlands, over a surfaced highway through the beautiful Blue Grass country of Kentucky. Berea is mentioned in this connection as it is a worth while objective, being the seat of Berea College, famous throughout the United States for the vocational training which it has given thousands of boys and girls of the mountains. Boone Tavern, conducted by the students of the college, offers excellent hotel accommodations. The many splendid college buildings, built by the students, which comfortably take care of more than 4000 students each year, the museum of relics and curios of the mountain people, are sufficient reward for the day or day and a half ride from Cincinnati.

Crossing Kentucky River.

The city of Lexington, the metropolis and social center of the justly famed Blue Grass country, the picturesque

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Scene in Mountains of North Carolina Near Hendersonville, Recently Adopted as Part of the Dixie Highway.

crossing of the Kentucky river, will tempt the average tourist to tarry a while along the way to Berea. It will hardly be advisable to go farther south along the eastern division until next summer, when the road will be formally opened, on account of the construction work going on in the mountains and the difficult detours which will be necessary.

Six cars carrying directors of the Dixie Highway Association and representatives of the Detroit, Cincinnati, Knoxville and Chattanooga Automobile Clubs made a trip of inspection over this division, leaving Cincinnati on June 23. In the party were Carl G. Fisher, Indianapolis, father of the Dixie Highway movement; Judge M. M. Allison, Chattanooga, president of the Dixie Highway Association; Harry L. Gordon, John L. Shuff of Cincinnati, A. F. Sanford, publisher of the Journal-Tribune, Knoxville, Tenn.; Col. Milton B. Ochs, publisher Chattanooga Times; W. T. Anderson, publisher Macon Telegraph, Macon, Ga.; A. G. Batchelder, chairman, executive board of the American Automobile Association, Washington, D. C.; Rodman Wiley, commissioner of public roads of Kentucky, and Secretary V. D. L. Robinson, Chattanooga, of the Dixie Highway Association.

The Dixie Highway Association has been likewise successful in making financial provisions for the completion of the western division of the highway between Nashville and Chattanooga, and within 12 months a surfaced road over this routing is assured. The absence of a highway over Cumberland mountains has blocked the way of tourists to and from Florida for years, as it is one of the two logical outlets through the Cumberlands between the north central states and the southeast. Seventy per cent. of the construction of an entirely new road between the two Tennessee cities was secured prior to the war, when the work was halted.

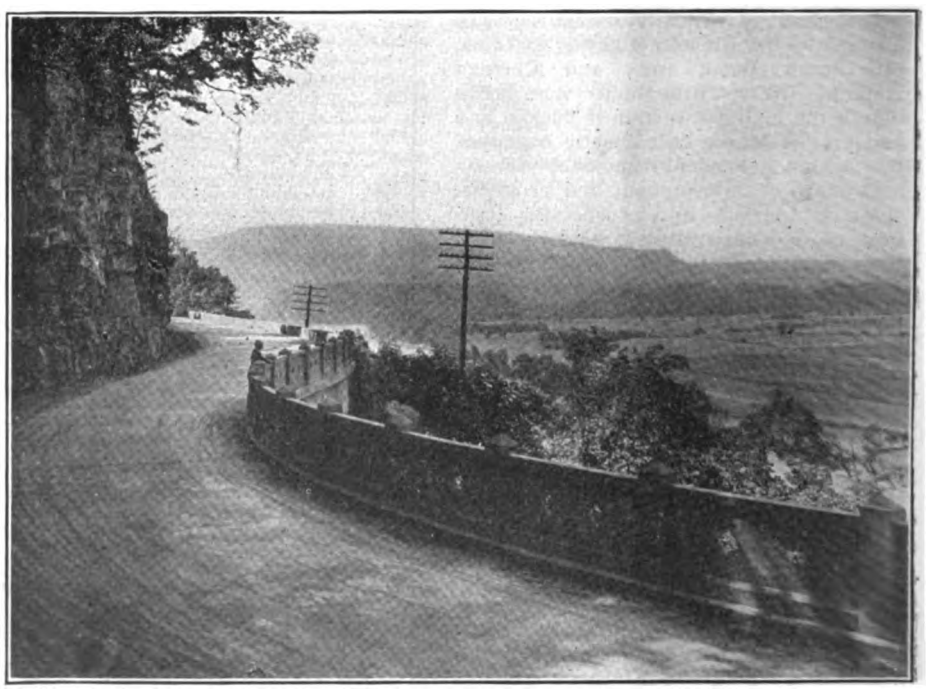
With the passage of a new road act and the appointment of a new state highway commission, the association continued to fight. A meeting was held in Nashville, June 6 at which agreements were reached with all the counties from Nashville to Monteagle, on top of Cumberland mountain, leaving only one county unprovided for. Chairman W. W. House and State Highway Engineer W. P. Moore made a tour of inspection over the highway, leaving Chattanooga June 17. The way has been paved for an agreement with Marion county which will result in the state taking over the completion of the entire highway. They confidently expect to do this within 12 months.

Although arrangements have only been made for the dedication of the eastern division next year, it is believed that plans can be made to dedicate the western division shortly after.

Permanent Improvements.

Definite provisions have been made in Michigan, Ohio, Illinois and Florida to pave the entire mileage of the highway through these states. Ohio will almost, if not entirely so, complete the paving of the highway between Detroit and Cincinnati this year.

Illinois and Michigan will pave the Dixie Highway just as rapidly as it can be done, as in both states the Dixie Highway has priority over other through roads. Provision has been made for the paving of 25 per cent. of the highway in the State of Georgia, by county bond issues and Federal aid. Other counties in this state are falling in line with similar bond issues. With the passage of the $40,000,000 bond issue in that state the permanent improvement of the entire mileage from the Tennessee to the Flor-



Road Up Lookout Mountain Near Chattanooga.

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ida line will be assured. Florida will vote a state bond issue during the present Legislature to provide the additional funds to connect the mileage of paving now existing along the highway in that state. Indiana will construct a considerable mileage of the highway of concrete or brick this year and next under the county unit bond issue plan adopted by the Legislature of 1919.

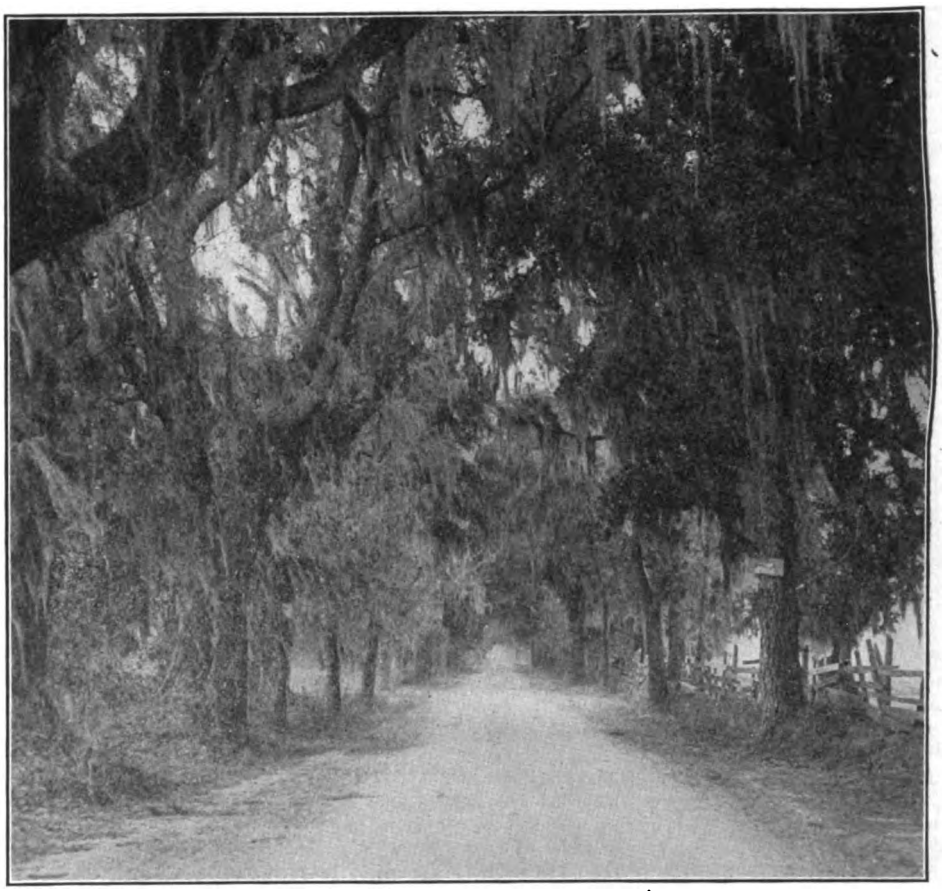
Cincinnati-Knoxville.

By way of location the Dixie Highway from Detroit to Mt. Vernon, Kentucky on the eastern division is open for all year round travel. Between Mt. Vernon and Livingston forces are constructing the last mile of road into the town of Livingston. From this point to the Rockcastle river, a distance of seven miles, a contract has been awarded for the grading. Contributions to the amount of $20,000 were secured between Detroit and Chattanooga to be used with Federal, state and county aid, making a total of $90,000 for this work. In Laurel county, from the Rockcastle river to Corbin, the highway has been graded and all but 13 miles of the surfacing completed. Commissioner Rodman Wiley of Kentucky has given the counties of Rockcastle and Laurel assurances that they will receive 50 per cent. Federal aid and 25 per cent. of state aid for the surfacing of the 20 miles in the two counties. At an estimate of $5000 per mile, it will require these counties to raise only $25,000 for this work.

Between Corbin and Knoxville.

During the war period state convicts were at work repairing the highway from Corbin to Williamsburg in Whitley county, a distance of approximately 12 miles. It now can be traveled all the year round. The convicts were also used in grading and putting in drainage from Williamsburg to Saxton, a distance of approximately six miles, and in the construction of the abutments for the steel bridge at Saxton. There remains only thre and a half miles of the highway to grade to the Tennessee line. The state convicts have again been put to work on this section. The county has available $53,000, which, with the Federal aid and state aid totaling $163,000, is considered ample to complete a well surfaced road, and the bridge at Saxton, through the county. The work will be pushed as rapidly as the construction can be done.

Campbell county, Tennessee, was one of the few counties which was able to carry on road construction work during the latter part of 1918. All of the grading has been completed and a part of the surfacing from Jellico on the Kentucky-Tennessee line to La Follette, where the surfaced road to Knoxville is encountered. The contract for a large part of the remaining surfacing has been awarded and work is under way. The county had $100,000 on Jan. 1 to complete the work. It was promised $25,000 of state aid and additional Federal aid by the old Tennessee Highway Commission. Even if the county should not obtain this Federal and state aid from the new commission, it is possible for the county to complete the surfacing. From Knoxville to Chattanooga a surfaced road is now provided.



Savannah's Moss Hung Oaks.

Provisions for Highway.

The rapidity with which Dixie Highway counties in Georgia are following each other in the issuance of bonds in accounts from $100,000 to $700,000 indicates that no difficulty may be expected regarding the completion of the Dixie Highway in that state, with a large part of the mileage paved with concrete. Five Dixie Highway counties have voted $2,200,000 in bonds and six more have called elections to be held this month for bonds amounting to $2,287,000. From reports received by the association from additional counties, which have not yet determined on the amount or the date of election, this amount will be increased by another $2,000,000. This does not take into consideration the Federal aid which will be spent in these counties or the passage of the $40,000,000 bond issue which will be voted upon by the Legislature in July. Bonds have been voted or elections called in the state for a total of $11,000,000, which will probably be increased to at least $15,000,000 by July 1.

Rome Route to Atlanta.

Between Chattanooga and Atlanta it is reasonable to expect that the Rome route will be paved for a large part of the distance and will be a hard surfaced road by fall of this year. Just what is done on the Dalton route will depend on Whitfield and Gordon counties. Floyd county is planning a large bond issue to pave the highway through the county. Bartow county, in view of the preparations on the Rome route, has announced that the highway from the Floyd county line through Cartersville to the Cobb county line will be first improved under the $400,000 bond issue. Cobb county votes on a bond issue, the amount to be determined, to connect the paving of Bartow county with that of Fulton county.

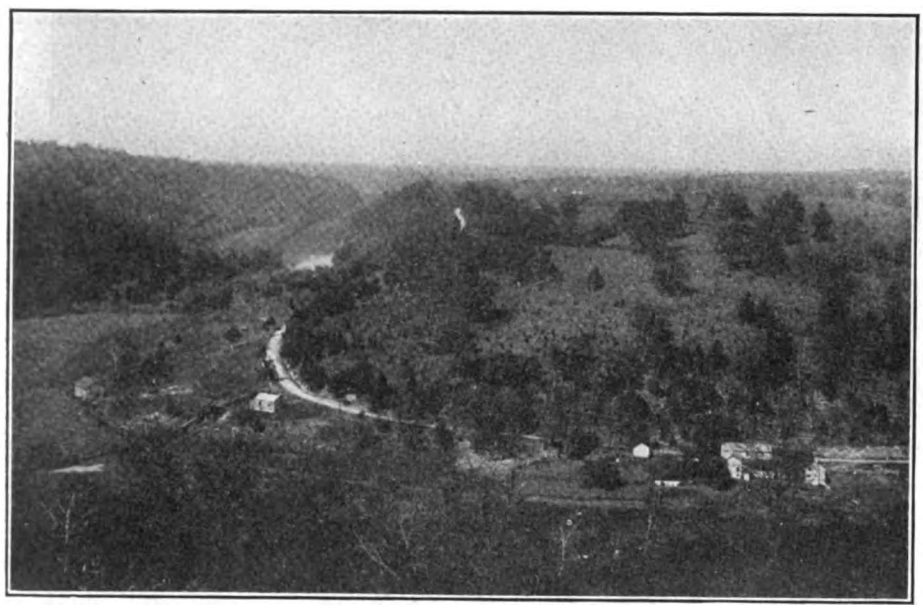
Atlanta to Macon Road.

Between Atlanta and Macon two of the four counties outside of Fulton which will pave her part of the mileage of the Dixie Highway this year have voted bonds to surface their part with concrete. Spalding county, of which Griffin is the county seat, voted $350,000 in bonds. Before the bonds were voted this county advertised for bids on six miles of 18-foot concrete road along the Dixie Highway toward Atlanta out of a separate fund. Bibb county, of which Macon is the county seat, has voted $700,000 in bonds for the paving of the Dixie Highway and other roads. It is believed that two remaining counties will fall in line, giving a boulevard between the two Georgia cities.

Sand Roadway Eliminated.

Between Macon and Jacksonville, on the central division, Charlton county, of which Folkston is the county seat on the banks of the St. Mary's river, which is known by every tourist who has attempted to go to Florida for its mileage of almost impassable sand, was the first county to vote bonds on this division. This county, which is the largest and at the same time has the lowest assessed valuation in the State of Georgia, has voted its limit of $75,000 in bonds which will be increased by $25,000, which Miami and Jacksonville automobile clubs have

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Dixie Highway Near Richmond, Ky.

agreed to assist in raising, practically all of which with Federal aid will be used in building the Dixie Highway through the county. Ware county, which is separated from Charlton by only six miles of the highway in Pierce county, voted last month on $630,000 to pave the Dixie Highway. Pulaski county, of which Hawkinsville is the county seat, has voted $200,000 and Ben Hill, with Fitzgerald, its county seat, has also voted on $157,000 in bonds. The difficult stretch at the present time is in Ware, Pierce and Charlton counties.

Nassau county, Florida, has likewise solved its difficulty of getting rid of the sand on this division into Jacksonville.

ITINERARY.

THE DIXIE HIGHWAY.

Night Stops — Chicago, Indianapolis, Louisville, Ky.; Nashville, Chattanooga, Atlanta, Macon, Jacksonville, Miami, Gainesville, Tallahassee, Macon, Knoxville, Cincinnati, Toledo, Detroit, Travas City, Mackinaw, Muskegon, South Bend.

Chicago-Danville, Ill.

	Miles		Miles
Chicago	0.0	Watseka	84.2
Chicago H'ghts	28.8	Hoopeston	107.2
Momence	54.0	Danville	135.8

Danville, Ill.-Indianapolis, Ind.

	Miles		Miles
Danville	0.0	Brownsburg	74.6
Covington, Ind.	12.8	Indianapolis	88 9



In Heart of Cumberlands.

Indianapolis-Dayton, O.

	Miles		Miles
Indianapolis	0.0	Eaton, O	84.6
Knightstown	34.2	Dayton	108.6
Richmond, Ind.	68.8		

Indianapolis-Louisville, Ky.

	Miles		Miles
Indianapolis	0.0	Bedford	77.4
Martinsville	30.7	Paoli	101.0
Bloomington	52.8	Louisville	147.6

Louisville-Nashville, Tenn.

	Miles		Miles
Louisville	0.0	Cave City	134 1
Elizabethtown	45.3	Russelville	194.0
Mumfordsville	76.6	Nashville	249.3

Nashville-Chattanooga.

	Miles		Miles
Nashville	0.0	Pelham	80.4
Lavergne	15.7	Tracy City	93.9
Murfreesboro	31.8	Sequatchie	110.3
Beach Grove	49.0	Jasper	114.2
Manchester	63.1	St. Elmo	137 3
Hillsboro	71.4	Chattanooga	140.1

Chattanooga-Atlanta, Ga.

	Miles		Miles
Chattanooga	0.0	Marietta	120.7
Summerville	45.1	Atlanta	139.0
Rome	70.5		

Atlanta-Milledgeville.

	Miles		Miles
Atlanta	0.0	Madison	70.8
Decatur	6.6	Eatonton	94.7
Stone Mountain	16.6	Milledgeville	116.3

Atlanta-Macon, Ga.

	Miles		Miles
Atlanta	0.0	Forsyth	69.3
Griffin	39.8	Macon	94 5

Macon-Jacksonville, Fla.

	Miles		Miles
Macon	0.0	Waycross	174.3
Perry	28.2	Jacksonville	254.8
Fitzgerald	95 7		

Jacksonville-Miami, Fla.

	Miles		Miles
Jacksonville	0.0	Melbourne	203.3
St. Augustine	39.8	Fort Pierce	252.1
Hastings	58.3	W. P'm Beach	311.9
Dayton	113.2	F. Lauderdale	354.0
Titusville	161.9	Miami	381.9

Miami-Jupiter, Fla.

	Miles		Miles
Miami	0.0	W. P'm Beach	69.1
F. Lauderdale	26.1	Jupiter	85.9

Jupiter-Arcadia, Fla.

	Miles		Miles
Jupiter	0.0	Arcadia	144.5
Okeechobee	54.5		

Arcadia-Gainesville, Fla.

	Miles		Miles
Arcadia	0.0	Leesburg	167.6
Bartow	52.5	Ocola	205.9
Orlando	116.0	Gainesville	249.8

Gainesville-Tallahassee.

	Miles		Miles
Gainesville	0.0	Perry	118.4
Newberry	26.0	Simmons	139.4
Trenton	40.3	Lamont	150.9
Mayo	83.0	Tallahassee	181.4

Tallahassee-Jacksonville.

	Miles		Miles
Tallahassee	0.0	Live Oak	83.4
Monticello	21.1	Lake City	108.6
Madison	54.2	Jacksonville	169.8

Tallahassee-Macon, Ga.

	Miles		Miles
Tallahassee	0.0	Americus	129.1
Thomasville	34.3	Ft. Valley	174.7
Camilla	66.5	Macon	201.5
Albany	92.2		

Macon-Atlanta, Ga.

	Miles		Miles
Macon	0.0	Griffin	54.7
Forsyth	25 2	Atlanta	94.5

Atlanta-Chattanooga, Tenn.

	Miles		Miles
Atlanta	0.0	Dalton	90.2
Cartersville	41.3	Chattanooga	124.6

Chattanooga-Knoxville, Tenn.

	Miles		Miles
Chattanooga	0.0	Kingston	84.0
Dayton	38.9	Knoxville	131.5

Knoxville-Cincinnati, O.

	Miles		Miles
Knoxville	0.0	Berea	168.6
Cumb'land Gap	67.6	Richmond	183.3
Middlesboro	71.4	Lexington	209.1
Barboursville	99.1	Georgetown	218.0
Corbin	116.1	Williamstown	252.5
London	132.6	Covington	280.3
Mt. Vernon	148.6	Cincinnati	290.5

Cincinnati-Toledo, O.

	Miles		Miles
Cincinnati	0.0	Sidney	96.6
Middletown	33.0	Lima	132.0
Dayton	56.1	Findley	164.3
Troy	76.2	Bowling Green	187.2
Piqua	84.2	Toledo	210.0

Toledo-Detroit, Mich.

	Miles		Miles
Toledo	0.0	Old Port	29.9
La Salle	16.2	Wyandotte	46.7
Monroe	20.7	Detroit	58.4

Detroit-Mackinaw, Mich.

	Miles		Miles
Detroit	0.0	Alpena	271.2
Flint	68.9	Onaway	340.0
Bay City	118.3	Mackinaw	382.7
Tarvas City	196.8		

Mackinaw-South Bend, Ind.

	Miles		Miles
Mackinaw	0.0	Grand Haven	251.8
Petosky	38.3	Grand Rapids	283.0
Travers City	108.9	Kalamazoo	331.6
Manistee	141.4	South Bend	400.7
Muskegon	238.8		

South Bend-Indianapolis, Ind.

	Miles		Miles
South Bend	0.0	Logansport	65.7
Plymouth	23.4	Indianapolis	135.9

(Cross route from Macon, Ga., to Jacksonville, Fla., via Savannah, Ga.)

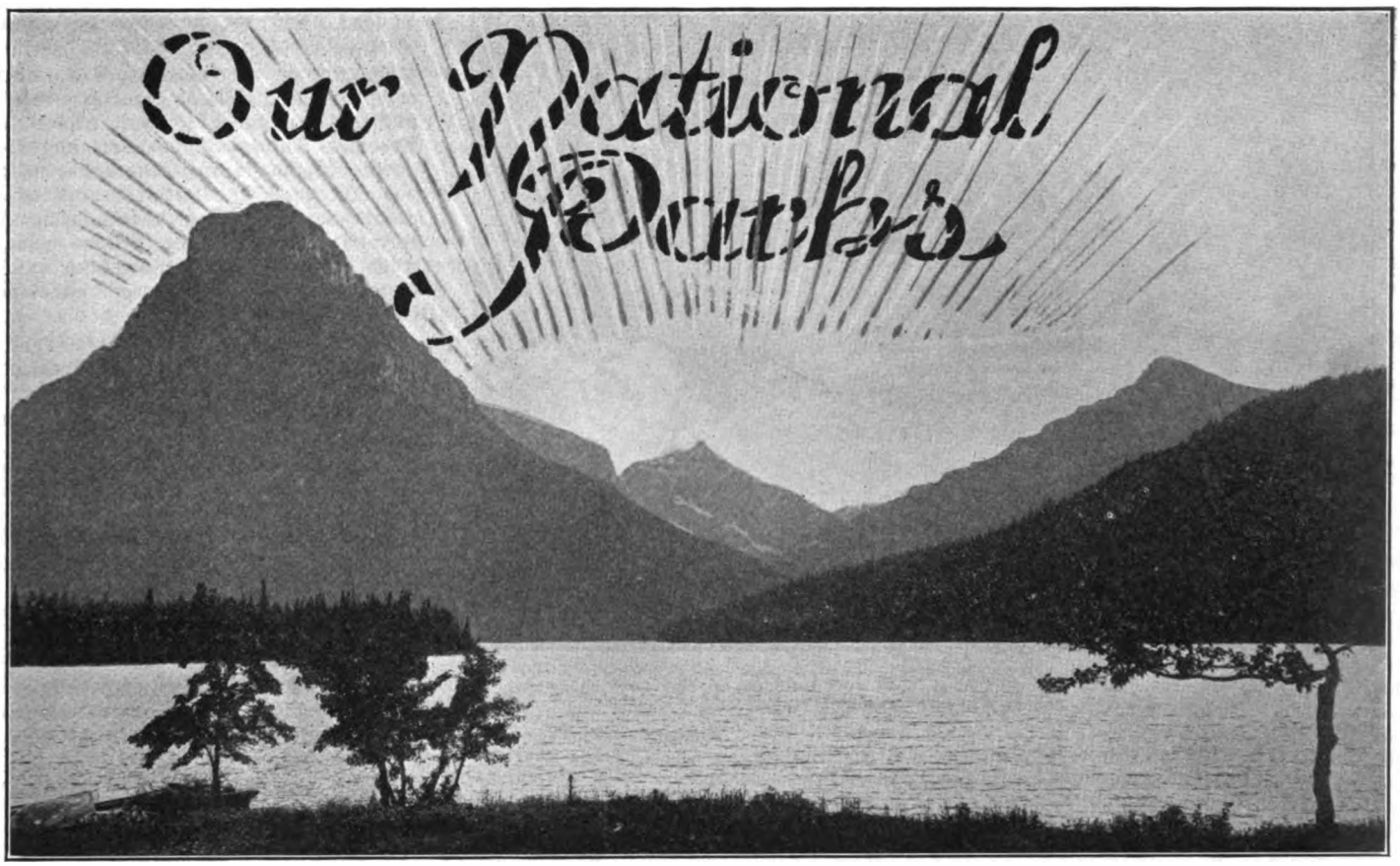
Macon, Ga.-Jacksonville, Fla.

	Miles		Miles
Macon	0.0	Savannah	207.5
Milledgeville	30.0	Riceboro	242.1
Waynesboro	112.7	Brunswick	283.4
Springfield	181.3	Jacksonville	373.7



Crossing a Stream.

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Medicine Lake, with Mt. Rockwell in Background, Glacier National Park.

TO BUILD a railroad, reclaim lands, give new impulse to enterprise and offer new doors to ambitious capital—these are phases of the ever widening life and activity of this nation. The United States, however, does more; it furnishes playgrounds to the people which are without any rivals in the world. Just as the cities are seeing the wisdom and necessity of open spaces for the children, so with a very large view the nation has been saving from its domain the rarest places of grandeur and beauty for the enjoyment of the world.

This nation is richer in natural scenery of the first order than any other nation; but it does not know it. It possesses an empire of grandeur and beauty which it scarcely has heard of. It owns the most inspiring playgrounds and best equipped nature schools in the world and is serenely ignorant of the fact.

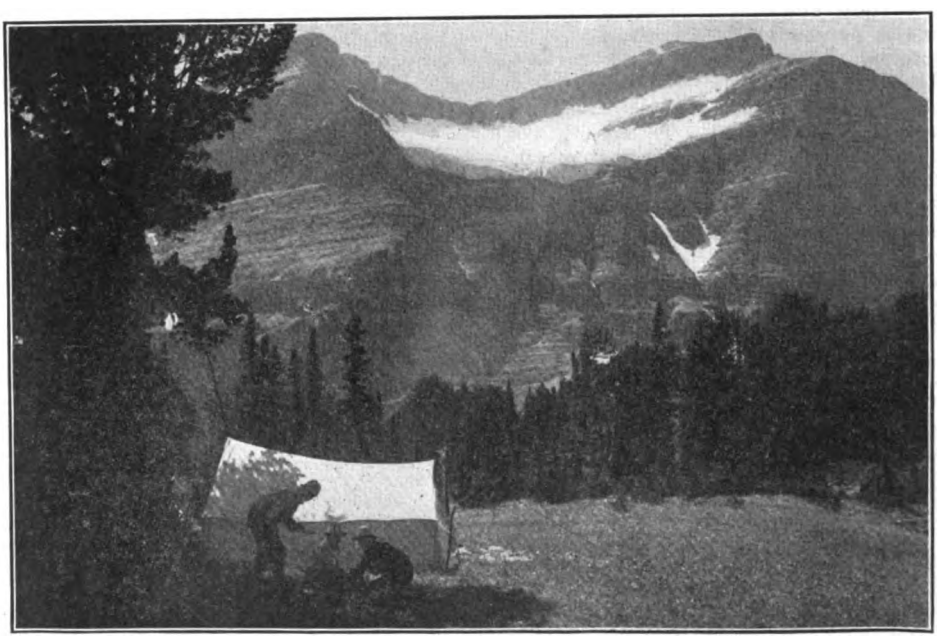
Individual features of several of our national parks are known the world over; but few to whom the Yosemite Valley is a household word know that its seven wonderful miles are a part of a scenic wonderland of 1100 square miles, called the Yosemite National Park. So with the Yellowstone; all have heard of its geysers, but few indeed of its 3300 square miles of wilderness beauty.

Land of Wonders.

The Yellowstone National Park is the largest and most widely celebrated of our national parks. It is a wooded wilderness. It contains more geysers than are found in the rest of the world together. It has innumerable boiling springs whose steam mingles with the clouds.

It has many rushing rivers and large lakes. It has waterfalls of great height and large volume. It has fishing waters unexcelled. It has canyons of sublimity, one of which presents a spectacle of broken color unequaled. It has areas of petrified forests with trunks standing. It has innumerable wild animals which have ceased unduly to fear man; in fact, it is unique as a bird and animal sanctuary.

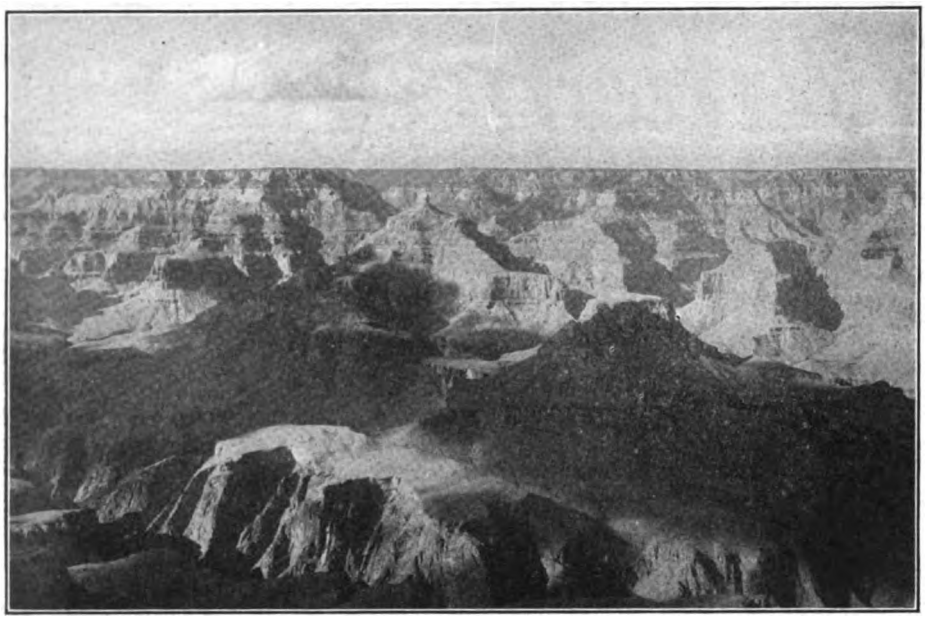
It has great hotels and many public camps. It has 200 miles of excellent roads. It is an ideal summer school of nature study.



Camping in the Pines in Glacier National Park.

The Yellowstone is associated in the public mind with geysers only. Thousands even of those who, watches in hand, have hustled from sight to sight over the usual stage schedules, bring home vivid impressions of little else. There never was a greater mistake. Were there no geysers, the Yellowstone watershed alone, with its glowing canyon, would be worth the national park. Were there also no canyon, the scenic wilderness

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Gathering Shadows, Grand Canyon, Arizona.

and its incomparable wealth of wild animal life would be worth the national park.

The personality of the Yellowstone is threefold. The hot water manifestations are worth minute examination, the canyon a contemplative visit, the park a summer. Dunraven Pass, Mount Washburn, the canyon at Tower Falls, Shoshone Lake, Sylvan Pass—these are known to very few indeed.

Many-Colored Canyon.

From Inspiration Point, looking 1000 feet almost vertically down upon the foaming Yellowstone river, and southward three miles to the Great Falls, the hushed observer sees spread before him the most glorious kaleidoscope of color he will ever see in nature. The steep slopes are inconceivably carved by the frost and the erosion of the ages. Sometimes they lie in straight lines at easy angles, from which jut high rocky prominences. Sometimes they seem carved from the side walls. Here and there jagged rocky needles rise perpendicularly like groups of gothic spires.

And the whole is colored as brokenly and vividly as the field of a kaleidoscope. The whole is streaked and spotted and stratified in every shade from the deepest orange to the faintest lemon, from deep crimson through all the brick shades to the softest pink, from black through all the grays and pearls to glistening white. The greens are furnished by the dark pines above, the lighter shades of growth caught here and there in soft masses on the gentler slopes and the foaming green of the plunging river so far below. The blues, ever changing, are found in the dome of the sky overhead.

Great Animal Refuge.

The Yellowstone National Park is by far the largest and most successful wild animal preserve in the world. Since it was established in 1872 hunting has been strictly prohibited, and elk, bear, deer of several kinds, antelope, bison, moose and bighorn mountain sheep roam the plains and mountains in large numbers. Thirty thousand elk, for instance, live in the park. Antelope, nearly extinct elsewhere, here abound.

The animals have long since to fear man as wild animals do everywhere except in our national parks. While few tourists see them who follow the beaten roads in the everlasting sequence of stages, those who linger in the glorious wilderness see them in an abundance that fairly astonishes.

The park has entrances on all four sides. Three have railroad connections; the southern entrance, by way of Jackson's Hole and past the jagged snowy Tetons, is available for vehicles. The roads from all entrances enter a central belt road which makes a large circuit connecting places of special interest. Five large hotels are located at points convenient for seeing the sights, and are supplemented by a dozen or more public camps at modest prices.

Who does not know of the Yosemite Valley? And yet, how few have heard of the Yosemite National Park?

The first view of most spots of unusual celebrity often falls short of expectation, but this is seldom, if ever, true of the Yosemite Valley. The sheer immensity of the precipices on either side of the peaceful floor; the loftiness and the romantic suggestion of the numerous waterfalls; the majesty of the granite walls and the unreal, amost fairy quality of the ever-varying whole cannot be successfully foretold.

The Yosemite Falls drop 1430 feet in one sheer fall, a height equal to nine Niagara Falls piled one on top of the other. The Lower Yosemite Fall, immediately below, has a drop of 320 feet, or two Niagaras more. Vernal Falls has the same height. The Nevada Falls drops 594 feet sheer and the celebrated Bridalveil Falls 620 feet. Nowhere else in the world may be had a water spectacle such as this.

Summer in the Yosemite is unreal. The valley, with its foaming falls dissolving into mists, its calm forests hiding the singing river, its enormous granites peaked and domed against the sky, its inspiring silence haunted by distant water, suggests a dream. One has a sense of fairyland and the awe of infinity.

Imagine Cathedral Rocks rising 2600 feet above the wild flowers, El Capitan 3600 feet, Sentinel Dome 4000 feet, Half Dome 5000 feet and Cloud's Rest 6000 feet! And among them the waterfalls!

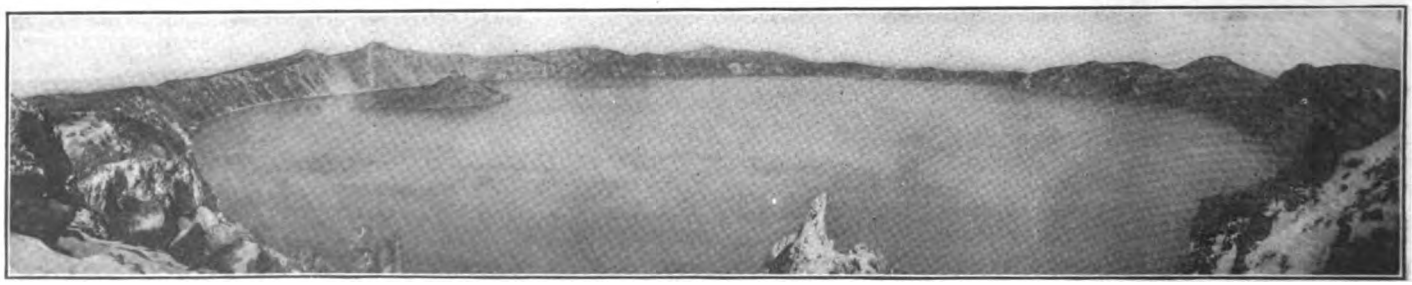
Even the weather appears impossible; the summers are warm, but not too warm; dry, but not too dry; the nights cool and marvelously starry.

A few miles away are the Big Trees, not the greatest groves nor the greatest trees, for those are in the Sequoia National Park, 100 miles south, but these groves containing monsters which, next to Sequoia's, are the hugest and the oldest living things. Of these the Grizzly Giant is king—whose diameter is nearly 30 feet, whose girth is more than 200. Their presence commands the silence due to worship.

Living is comfortable in the Yosemite. Four roomy public camps, two excellent hotels and several new lodges offer the visitor a choice of kind and price. New hotels are building to replace the old. The Yosemite is an excellent place to camp out.

Tioga Road.

Above the north rim of the valley the old Tioga Road, which the Department of the Interior acquired in 1915 and put into good condition, crosses the park



Crater Lake as Seen from Garfield Peak Crater National Park.

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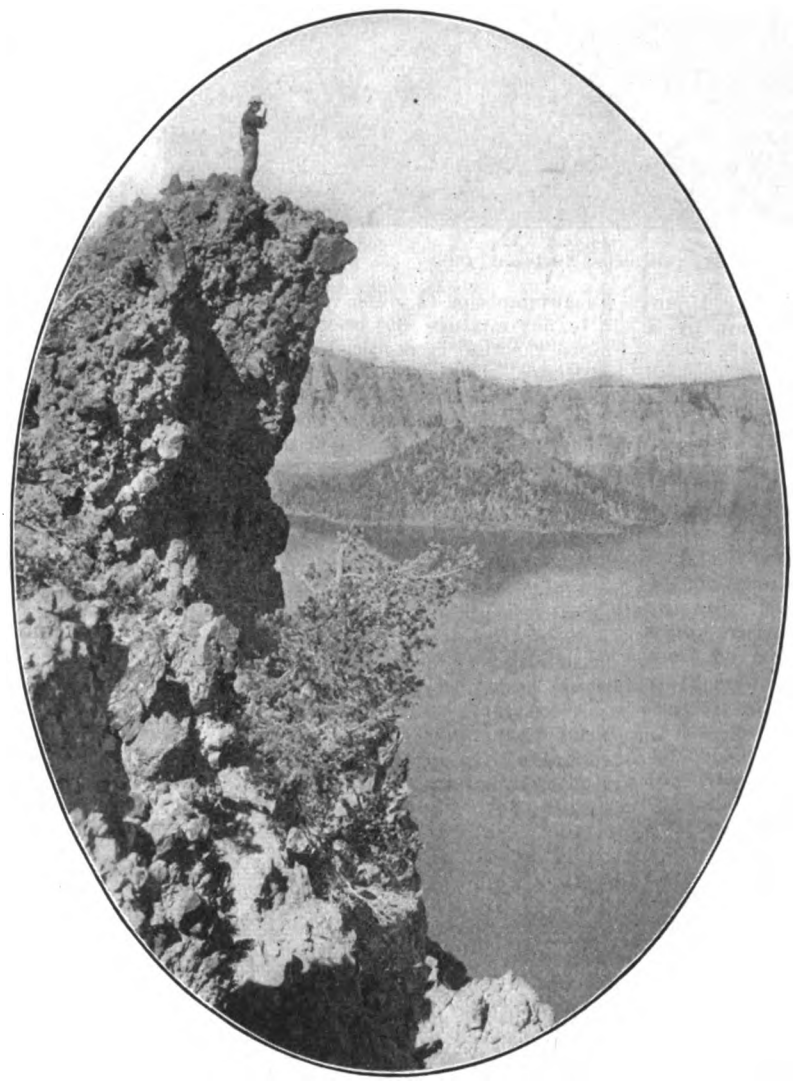
from east to west, affording a new route across the Sierra and opening to the public for the first time the magnificent scenic region in the north.

Before the road pointed the way to the magnificent mountain the valley area constituting the northern half of the Yosemite National Park, this pleasure paradise was known to none except a few enthusiasts who penetrated its wilderness year after year with camping outfits. This is the region of rivers and lakes and granite domes and brilliantly polished glacial pavements.

From the base of the Sierra crest, born of its snows, the Tuolumne River rushes westward, roughly paralleling the Tioga Road. Midway it slants sharply down into the Tuolumne Canyon, forming in its mad course a water spectacle destined some day to world fame.

Nature's forest masterpiece is John Muir's designation of the giant tree after which is named the Sequoia National Park in middle eastern California. Here within an area of 237 square miles are found several large groves of the celebrated Sequoia gigantea, popularly known as the Big Tree of California. More than a million of these trees grow within the park's narrow confines, many of them mere babes of a few hundred years, many sturdy youths of a thousand years, many in the young vigor of two or three thousand years, and a few in full maturity. The principal entrance is Visalia, Cal.

Half a dozen miles away is the General Grant National Park, whose four square miles were set apart because they contained the General Grant Tree, second only in size and age to the patriah of all, the General Sherman Tree. On Sequoia's favored slopes grow other monsters also. It is the park of big trees of many kinds and it is the park of birds.



Wizard Island from Garfield Peak in Crater Lake National Park.

The Sequoia National Park is the gateway to one of the grandest scenic areas in this or any other land. Over its borders to the north and east lies a land of sublime mobility whose wild rivers and tortuous canyons, whose glacier carved precipices and vast snowy summits culminating in the supreme altitude of Whitney, will make it some day surpassed in celebrity by none.

Mount Rainier.

From the Cascade Mountains in Washington rises a series of volcanoes which once blazed across the sea like giant beacons. Today, their fires quenched, they suggest a stalwart band of Knights of Ages, helmeted in snow, armored in ice, standing at parade under a carpet patterned gorgeously in wild flowers.

Easily chief of this knightly band is Mount Rainier, a giant towering 14,408 feet above tidewater in Puget Sound. Home-bound sailors far at sea mend their courses from his silver summit.

This mountain has a glacier system far exceeding in size and impressive beauty that of any other in the United States. From its snow-covered summit 28 rivers of ice pour slowly down its sides. Seen upon the map, as if from an aeroplane, one thinks of it as an enormous frozen octopus stretching icy tentacles down upon every side among the rich gardens of wild flowers and splendid forests of firs and cedars below.

The park is easily accessible. An excellent road will carry the visitor by auto.

Crater Lake.

Crater Lake is the deepest and the bluest lake in the world. It measures 2000 feet of solid water and the intensity of its color is unbelievable even while you look at it. Its cliffs from sky line to surface are 1000 feet high. It has no inlet and no visible outlet, for it occupies the hole left when in the dim ages before man a volcano collapsed and disappeared within itself.

It is a gem of wonderful color and a setting of pearly lavas relieved by patches of pine green and snow white—a gem which changes hue with every atmospheric change and every shift of light.

Mesa Verde.

Mesa Verde National Park is in the extreme southwestern corner of Colorado and is reached by two routes from Denver. A night is usually spent en route, and the ruins are reached by wagon, horseback or automobile from Mancos. Apart from the ruins the country is one of much beauty and interest.

The views are inspiring the entire country "different." In the spring the entire region blooms. It used to be a country of wild animals and at times deer are still plentiful. There is a thoroughly comfortable hotel near Spruce Tree House.

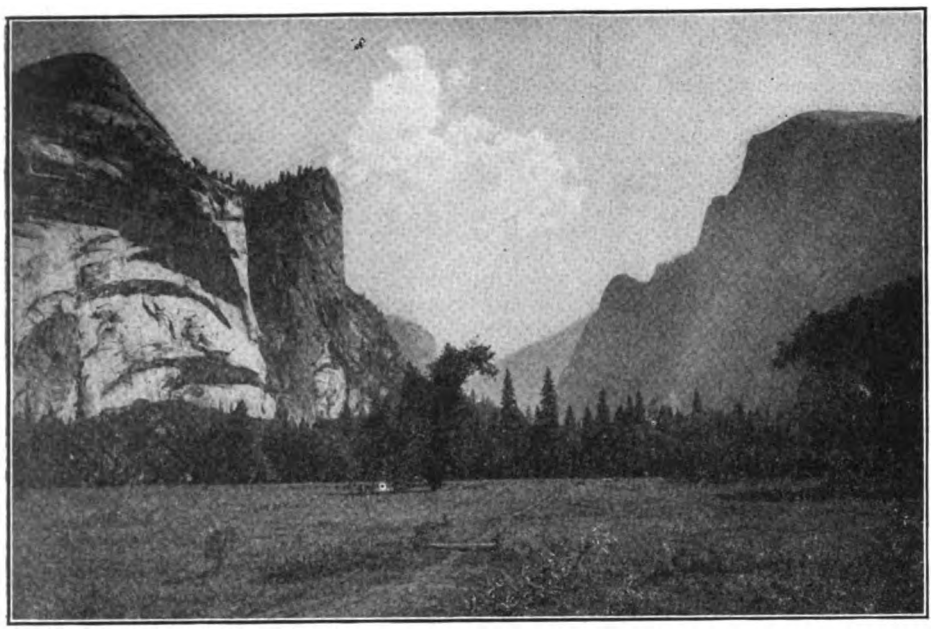
Notwithstanding the 60 glaciers from which it derives its name, the Glacier National Park is chiefly remarkable for its picturesquely modeled peaks, the unique quality of its mountain masses, its gigantic precipices and the romantic loveliness of its 250 lakes. Though most of our national parks possess similar general features in addition to those which sharply differentiate each from every other, the Glacier National Park shows them in special abundance and unusually happy combination. In fact, it is the quite extraordinary, almost sensational, massing of these scenic elements which gives it its marked individuality.

The Glacier National Park lies in northwestern Montana, abutting the Canadian boundary. It encloses the continental divide of the Rocky Mountains at that point; in fact, from one spot known as the Triple Divide, where waters flow into the Pacific Ocean, Hudson Bay and the Gulf of Mexico.

For many years the mecca of eastern mountain lovers has been the Rockies. For many years the name has summed European ideas of American mountain grandeur. Yet it was not until 1915 that a particular section of the enormous area of magnificent and diversified scenic range thus designated was chosen as the representative of the noblest qualities of the whole. This is the Rocky Mountain National Park.

And it is splendidly representative. In nobility, in calm dignity, in the sheer glory of stalwart beauty, there is no mountain group to excel the company of snow-capped veterans of all the ages which stands at everlasting parade behind its grim, helmeted captain, Longs Peak.

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The Domes in Yosemite National Park.

The accessibility of the Rocky Mountain National Park is apparent by a glance at any map.

Grand Canyon.

"More mysterious in its depth than the Himalayas in their height," writes Prof. John C. Van Dyke, "the Grand Canyon remains not the eighth, but the first wonder of the world. There is nothing like it."

Even the most superficial description of this enormous spectacle may not be put in words. The wanderer upon the rim overlooks a thousand square miles of pyramids and minarets carved from the painted depths. Many miles away and more than a mile below the level of his feet he sees a tiny silver thread which he knows is the giant Colorado.

He is numbed by the spectacle. At first he cannot comprehend it. There is no measure, nothing which the eye can grasp, the mind fathom.

It may be hours before he can even slightly adjust himself to the titanic spectacle, before it ceases to be utter chaos; and not until then does he begin to exclaim in rapture.

Permits for Autos.

The National Parks are located as follows: Hot Springs Reservation, middle Arkansas; Yellowstone, northwestern Wyoming; Yosemite, middle eastern California; Sequoia, middle eastern California; General Grant, middle eastern California; Mount Rainier, west central Washington; Crater Lake, southwestern Oregon; Mesa Verde, southwestern Colorado; Platt, southern Oklahoma; Glacier, northwestern Montana; Rocky Mountain, north middle Colorado. National parks of less popular interest are: Sully's Hill, North Dakota; Wind Cave, South Dakota; Casa Grande Ruin, Arizona.

Fees for automobile and motorcycle permits for Yellowstone Park are $7.50 and $2.50 respectively and are good for the entire season, expiring Dec. 31. Due to the high altitude of the park roads, averaging nearly 7000 feet, the power of all automobiles is much reduced, so that a leaner mixture and about 50 per cent. more gasoline is required than at lower altitudes. Likewise, one lower gear will generally have to be used on grades than would be necessary elsewhere. A further effect that must be watched is the heating of the engine on long grades, which may become serious unless care is used. A copy of the regulations should be secured when one is about to enter any of the national parks.

The Yellowstone Trail is one of the most convenient for New Englanders and residents of New York state and the lake states to use in reaching the national parks.

A tour over the Yellowstone Trail affords the motorist an exceptionally instructive trip as he passes from Plymouth, Mass., where the Mayflower landed with its sturdy band of settlers, across the country through the densely populated sections into the vast wheat fields of Minnesota and the Dakotas into the western mining country and territory where many of the scenic wonders of the world are found in several of our great national parks.

The great impression among motorists who have never visited these great recreation grounds is that they are vast stretches of wilderness, whereby they are really ideal for touring and camping trips.

ITINERARY.
YELLOWSTONE TRAIL.

Night Stops—Plymouth, Mass.; Hartford, Conn.; Poughkeepsie, N. Y.; Binghamton, Olean, Youngstown, O.; Fort Wayne, Ind.; Chicago, Ill.; Milwaukee, Wis.; Minneapolis, Minn.; Millbank, S. D.; Selby, Terry, Mont.; Custer, Livingston, Butte, Missoula, Spokane, Wash.; Walla Walla, Tacoma. Twenty Days, 3946.4 Miles.

Plymouth-Providence.

	Miles		Miles
Plymouth	0.0	E. Providence	42.8
Middleboro	14.7	Providence	43.8
Taunton	25.8		

Providence-Hartford.

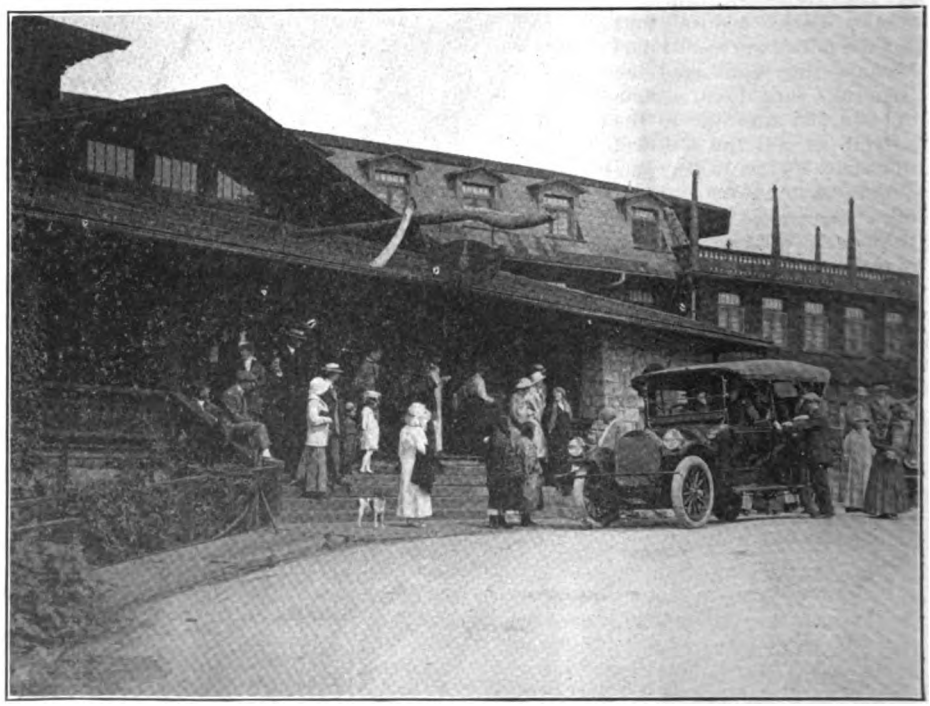
	Miles		Miles
Providence	0 0	Willimantic	56.0
Chepachet	15.4	Andover	65.3
Pomfret	32.1	Hartford	84.0

Hartford-Danbury.

	Miles		Miles
Hartford	0.0	N. Milford	38.9
Plainville	13.8	Brookfield	61.7
Bantam	38.2	Danbury	69.0

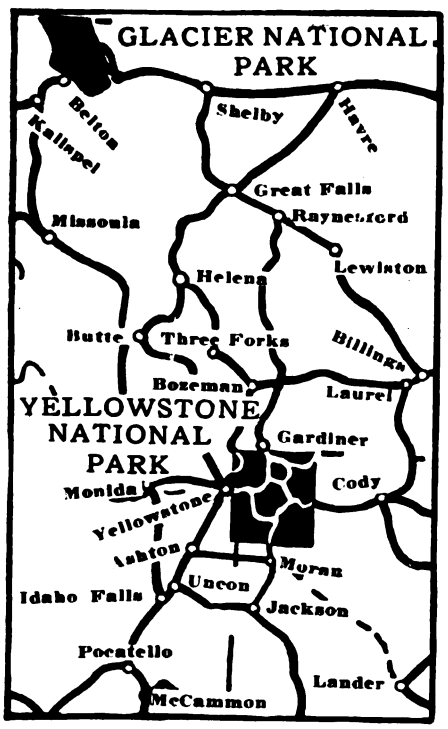
Danbury-Poughkeepsie, N. Y.

	Miles		Miles
Danbury	0 0	Stormville	27.8
Mill Plain	3.9	Fishkill P.	34.1
Brewster, N. Y.	10.0	N. Hackensack	37.7
Carmel	14.5	Poughkeepsie	45.1



Grand Canyon—Grand View Auto Party Leaving El Tovar.

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Poughkeepsie-Kingston, N. Y.

	Miles		Miles
Poughkeepsie	0.0	Rhinecliff	18.5
Hyde Park	6.1	Rondout F	18.6
Rhinebeck	16.2	Kingston	22.0

Kingston-Binghamton.

	Miles		Miles
Kingston	0.0	Afton	126.3
Arkville	57.8	Nineveh	131.6
Delgi	83.3	Belden	136.9
Unadilla	100.9	Sanitary Spa	142.6
Bainbridge	120.4	Binghamton	153.7

Binghamton-Elmira.

	Miles		Miles
Binghamton	0.0	Waverly	45.0
Owego	24.3	Lowman	55.6
Smithboro	35.2	Elmira	63.6

Elmira-Salamanca.

	Miles		Miles
Elmira	0.0	Almond	67.1
Corning	18.6	Alfred Sta	70.8
Addison	30.2	Andover	79.8
Cameron	43.2	Bolivar	101.9
Canisteo	56.5	Salamanca	138.2
Hornell	61.8		

Salamanca, N. Y.-Youngstown, O.

	Miles		Miles
Salamanca	0.0	Mercer	168.0
Warren	65.0	Youngstown	210.0
Franklin	128.0		

Youngstown-Akron, O.

	Miles		Miles
Youngstown	0.0	Ravenna	32.6
Edinburg	25.9	Akron	50.0

Akron-Ft. Wayne, Ind.

	Miles		Miles
Akron	0.0	Ottawa	147.8
Oberlin	46.7	Du Pont	162.8
Bellevue	83.0	Paulding	178.0
Fostoria	118.8	Ft. Wayne	218.0

Ft. Wayne-Chicago.

	Miles		Miles
Ft. Wayne	0.0	Valparaiso	119.2
Columbia City	20.5	East Chicago	146.2
Warsaw	42.9	Hammond	149.2
Plymouth	72.5	Chicago	170.2

Chicago-Milwaukee.

	Miles		Miles
Chicago	0.0	Kenosha	62.3
Evanston	13.1	Racine	73.0
Highland Pk	26.0	S. Milwaukee	87.0
Wankegan	46.5	Milwaukee	96.4

Milwaukee-Minneapolis.

	Miles		Miles
Milwaukee	0.0	Stanley	229.0
Fond Du Lac	62.0	Eau Claire	259.5
Oshkosh	81.0	St. Paul	358.7
Stevens Pt	140.3	Minneapolis	368.7

Minneapolis-Milbank.

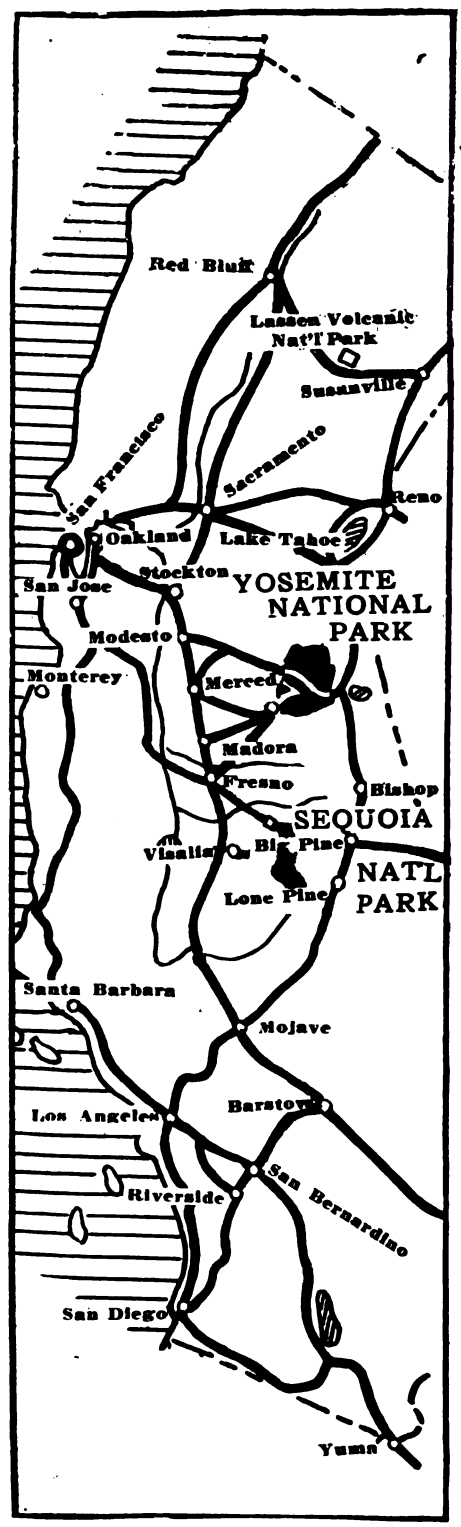
	Miles		Miles
Excelsior	0.0	Sacred Heart	122.9
Waconia	31.1	Granite Falls	131.9
Brownton	67.9	Ortonville	205.4
Hector	86.9	Milbank	219.9

Milbank-Selby.

	Miles		Miles
Milbank	0.0	Ipswich	127.0
Webster	45.0	Bowdle	157.0
Aberdeen	97.0	Selby	180 0

Selby-Hettinger.

	Miles		Miles
Selby	0.0	McIntosh	110.5
Mobridge	35.0	Hettinger	197.5





Hettinger-Terry.

	Miles		Miles
Hettinger	0.0	Baker	158.5
Bowman	72.0	Terry	260.5
Martin	115.5		

Terry-Custer.

	Miles		Miles
Terry	0.0	Forsyth	90.9
Miles City	39.3	Custer	142.6

Custer-Livingston.

	Miles		Miles
Custer	0.0	Reed Point	124.7
Billings	57.7	Livingston	185.5

Livingston-Butte.

	Miles		Miles
Livingston	0.0	Whitehall	105.1
Bozeman	26.7	Butte	139.2
Three Forks	61.5		

Butte-Drummond.

	Miles		Miles
Butte	0.0	Garrison	63.8
Anaconda	25.8	Drummond	86.6
Deer Lodge	52.3		

Drummond-Wallace.

	Miles		Miles
Drummond	0.0	Missoula	58.1
Bearmount	13.5	Wallace	181.5

Wallace-Spokane.

	Miles		Miles
Wallace	0.0	Coeur D'Alene	52.3
Kellogg	11.6	Spokane	86.0

Spokane-Walla Walla.

	Miles		Miles
Spokane	0.0	Dayton	143.5
Colfax	80.2	Walla Walla	176.4
Pomeroy	115.0		

Walla Walla-North Yakima.

	Miles		Miles
Walla Walla	0.0	Prosser	78.0
Sudbury	7.0	Grandview	91.0
Divide	26.0	Zillah	111.0
Wallula	29.0	Donald	120.0
Kennewick	45.0	Yakima	127.0
Kiona	63.0	North Yakima	132.0

North Yakima-Cle Elum.

	Miles		Miles
North Yakima	0.0	Thorp	53.0
Pomona	9.0	Teanaway	65.0
Wenas	27.0	South Cle Elum	69.0
Ellensburg	41.0	Cle Elum	72.0

Cle Elum-Tacoma.

	Miles		Miles
Cle Elum	0.0	Isaquak	90.0
Nelson	16.0	South Park	109.0
Laconia	43.0	Seattle	114.0
Edgewick	61.0	Christopher	146.0
Fall City	79.0	Tacoma	154.0

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PIKES PEAK HIGHWAY

GREAT lines of transportation are not those which connect communities of like interests and resources, but those which make possible the exchange of diversified products and the intermingling of peoples of different environment. An examination of the map of the United States reveals the strategic importance of the Pikes Peak Ocean-to-Ocean Highway as a main trunk line in a system of national highways, whether constructed for social, commercial or military purposes.

It crosses the continent midway between the northern and southern tiers of states, following generally the 40th parallel of latitude. It is a wonderful scenic route and follows historic trails. The logic of its alignment has been demonstrated successively by the Indian, the pioneer and the men who laid out the great railroad lines across the continent.

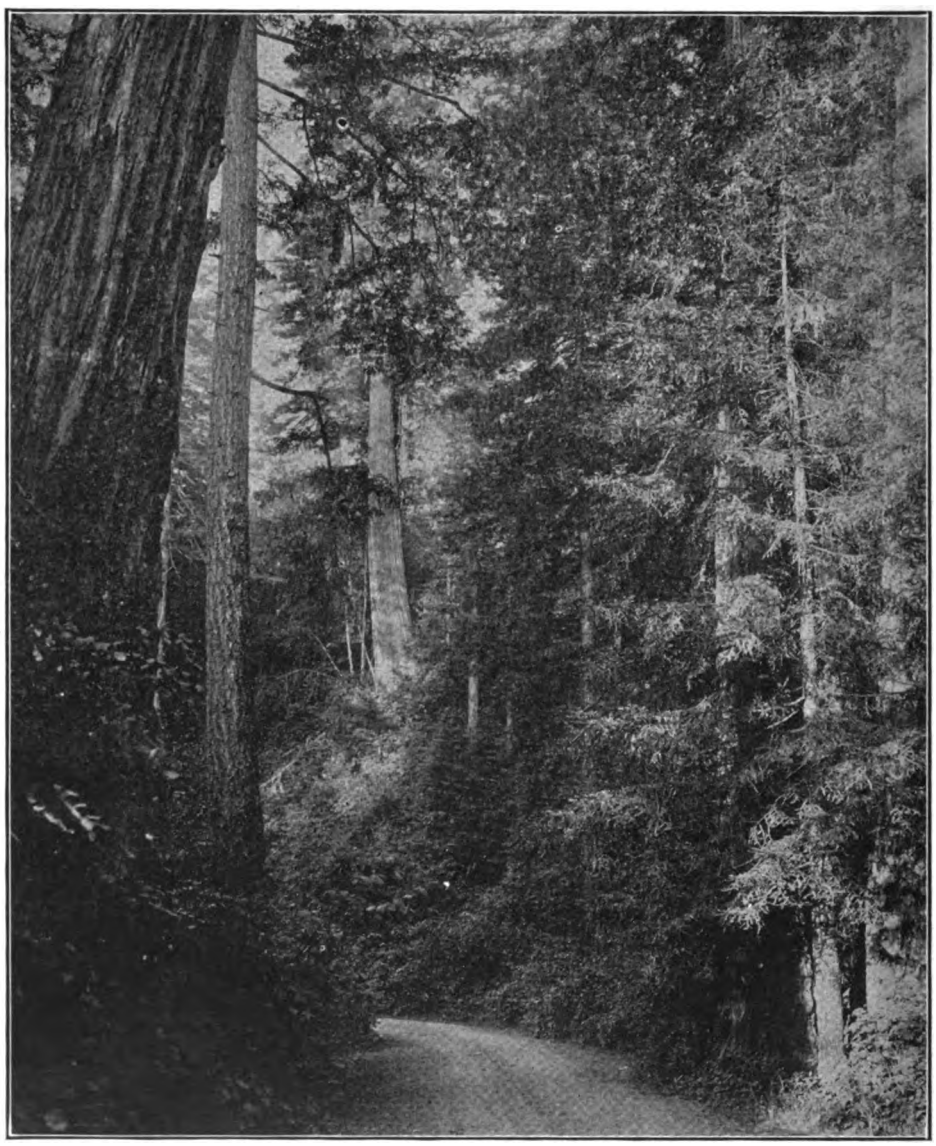
The Pikes Peak Ocean-to-Ocean Highway has been termed "The Appian Way of America." The name is fitting. The Appian Way of the Roman empire, designed primarily for military purposes, became during the succeeding centuries, a great line of communication for social and commercial purposes.

The highway links 12 states. It passes through six state capitals. It traverses 97 counties and passes through more than 500 hamlets, villages, towns and cities, and it serves in these and adjoining countries a total population of nearly 25,000,000.

The distance from Philadelphia to San Francisco is 3490 miles; from New York City to San Francisco 3564 miles. Road conditions are up to the average.

No Monotony in Tour.

There is no monotony in a tour over the Pikes Peak Ocean-to-Ocean Highway. There is always something that appeals to the person who is interested in the story of the nation's development, its stirring history, or its natural wonders—whether it is the sky line of America's greatest city or a sunset behind the Golden Gate that meets his eye; whether he visits the great steel mills of Pennsylvania, the manufacturing districts of New Jersey, or the automobile factories of Indiana; whether he passes through the corn fields of Illinois and Missouri, the wheat fields of Kansas, the bean fields of the eastern Colorado dry farm, the cattle and sheep ranges of the West, the fruit orchards of the Mississippi valley, the wonderful irrigated districts in Colorado, Utah and Nevada, or the orange and almond groves of California; whether he is crossing the rolling prairies or winding through the pine forests of the Feather river district in California; whether it is a reclamation project in the West or a munitions factory in the East that reminds him of the manifold activities of his government; whether he camps or fishes alongside the rippling mountain streams or registers at the ultra-fashionable hotel; whether he visits the coal mining district in Illinois and Ohio or the gold and silver mining districts in Colorado, Utah and Nevada; whether the road follows a trail blazed by the Indian or approaches a quarry where the bones of pre-historic animals are being unearthed; whether he inspects the Wilbur Wright Aviation Field in Ohio or the ruins of a frontier fort or mission in California; or whether he is touring that part of the highway which unfolds enchanting vistas as it crosses the Alleghanies, that winds along the wooded slopes of the Sierras, or that takes him through the rugged canons and almost to the timber line in the wonderland of the Rockies.



La Honda Redwoods in California, 25 Miles from San Francisco.

There is considerable hard surfaced road in the eastern states. Like other transcontinental routes through the central states, this is as yet only a graded dirt road. It follows the "divide country," rather than large water courses, and is kept in good condition by graveling and dragging. Through the western states, the mountain roads, except for some difficult stretches, are generally good; all the way it is through settled districts. Steady progress toward better roads is being made in every state.

The Pikes Peak Ocean-to-Ocean Highway, with its independent alignment clear across the continent, is a federation of state organizations, including the William Penn Highway Association in Pennsylvania, the Hannibal-Springfield Highway Association in Illinois, the Han-

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nibal and St. Joseph Cross State Highway Association in Missouri, the Rock Island Highway Association in Kansas, the original Lincoln Highway Association in Colorado, the Overland Trail Club in Nevada and the Feather River Route Association in California. With these there have been organized new state divisions in New Jersey, Ohio, Indiana, Utah and parts of Illinois and California.

All of these have been affiliated together to link up into one connected highway the great central route connecting the shores of the Atlantic and Pacific oceans. This association is a department of the National Highways Association and it also cooperates with the American Automobile Association.

The official marking of the Pikes Peak Ocean-to-Ocean Highway consists of red and white bands, 10 inches each in width, painted on poles at turns and cross roads and also frequently between turns. Enameled steel signs, reproducing the official marker design, are placed at each entrance to each town and also at intervals of not more than five miles between towns.

Folders containing reports as to road conditions in the eastern, central and mountain divisions have been published for free distribution.

The national headquarters and office of the secretary-treasurer are established at Colorado Springs, Col. The office of the president, C. F. Adams, is at Chillicothe, Mo. Information regarding the highway may be obtained by addressing either of these offices.

ITINERARY.

PIKE'S PEAK HIGHWAY.

Night Stops—New York, Reading, Pa.; Altoona, Pittsburgh, Columbus, O.; Indianapolis, Ind.; Decatur, Ill.; Quincy, Brookfield, Mo.; Belleville, Kan.; Norton, Burlington, Col.; Colorado Springs, Leadville, Glenwood Springs, Rangely, Colton, Utah; Salt Lake City, Snowville, Wells, Nev.; Battle Mountain, Lovelock, Truckee, Cal.; Sacramento, San Francisco. Twenty-five Days, 3594.2 Miles.

New York-Reading.

	Miles		Miles
New York.....	0.0	Easton	75.9
Newark	10.6	Bethlehem	87.4
Morristown....	30.2	Allentown	93.1
German Valley	47 4	Kutztown	111.0
Washington...	62.0	Reading	128.3

Reading-Altoona.

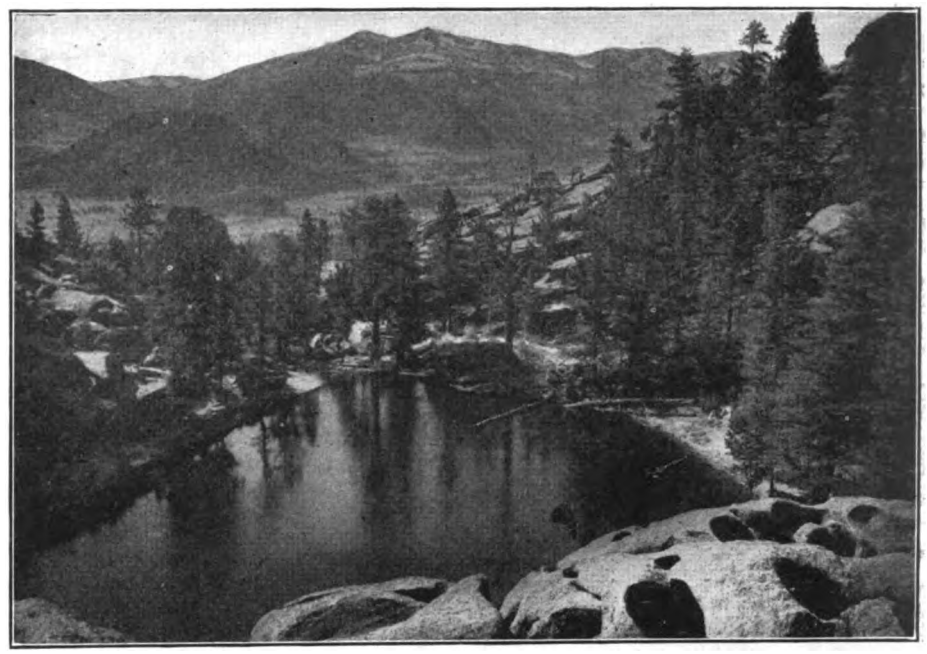
	Miles		Miles
Reading	0.0	Newport	79.9
Stouchsburg...	17.0	Mexico	97.4
Lebanon	27.8	Lewistown	112.9
Hummelstown.	43.9	Belleville	127.6
Harrisburg....	53.4	Alexandra	158.1
Clark's Ferry.	67.9	Altoona	190.1

Altoona-Pittsburgh.

	Miles		Miles
Altoona	0.0	N. Alexandria.	66.6
Hollidaysburg..	7.0	Delmont	74.5
Summit	17.4	Wilkinsburg ..	92.7
Clyde	47.5	Pittsburgh	99.7

Pittsburgh-Columbus.

	Miles		Miles
Pittsburgh	0.0	N. Comerstown	112.1
Florence	24.4	Franklin	130.6
Holiday Cove..	36.7	Dresden	141.7
Steubenville...	44.7	Newark	165.1
Cadiz	65.8	Columbus	179.1
Uhrichsville...	87.0	Columbia C....	183.1



Rocky Mountain National Park.

Columbus-Indianapolis.

	Miles		Miles
Columbus	0.0	Richmond	110.1
Brighton	30.2	Germantown..	124.3
Springfield	44.1	Ogden	142.0
Fairfield	57.0	Greenfield	158.2
Dayton	68.1	Cumberland ...	168.6
Eaton	93.1	Indianapolis ..	179.0

Indianapolis-Decatur.

	Miles		Miles
Indianapolis ..	0.0	Chrisman	85.3
Danville	19.7	Newman	103.5
Bainbridge ...	35.9	Tuscola	122.4
Rockville	59.1	Hammond	141.2
Montezuma ...	67.7	Decatur	164.8

Decatur-Quincy.

	Miles		Miles
Decatur	0.0	Beardstown ...	100.9
Buffalo	25.2	Rushville	114.0
Springfield	40.8	Mt. Sterling...	131.7
Berlin	55.9	Clayton	144.5
Jacksonville ..	73.4	Camp Point....	150.6
Concord	84.6	Quincy	174.7

Quincy-Brookfield.

	Miles		Miles
Quincy	0.0	Clarence	79.1
Hannibal	18.7	Macon City....	91.7
Monroe City...	45.7	Bucklin	120.1
Shelbina	66.0	Brookfield	131.3

Brookfield-St. Joseph.

	Miles		Miles
Brookfield	0.0	Hamilton	57.3
Wheeling	18.4	Cameron	72.4
Chillicothe	29.0	St. Joseph.....	107.3

St. Joseph-Belleville.

	Miles		Miles
St. Joseph.....	0.0	Seneca	85.8
Troy	14.8	Beattie	113.0
Highland	35.2	Marysville	121.1
Hiawatha	49.5	Washington ...	148.0
Sabetha	68.0	Belleville	185.5

Belleville-Norton.

	Miles		Miles
Belleville	0.0	Kensington ...	79 3
Courtland	16.7	Phillipsburg...	95.5
Mankato	34.0	Prairie View...	113.5
Smith Center...	65.2	Norton	138.0

Norton-Burlington.

	Miles		Miles
Norton	0.0	Colby	96.3
Dellvale	21.5	Brewster	115.0
Jennings	40.2	Goodland	133.3
Selden	63.2	Burlington	163.7

Burlington-Colorado Springs.

	Miles		Miles
Burlington	0.0	Limon	83.9
Stratton	18.4	Mattison	105 5
Selbert	34.7	Calhan	127.8
Arriba	58.7	Falcan	149.1
Genoa	70.6	Colorado Spr'gs	168.6

Colorado Springs-Leadville.

	Miles		Miles
Colorado Spr'gs	0.0	Bath	75.3
Edlowe	20.6	Buena Vista...	93.5
Pulvero	48.1	Granite	111.1
Hartsel	63.5	Leadville	135.2

Leadville-Glenwood Springs.

	Miles		Miles
Leadville	0.0	Wolcott	48.3
Pando	16.0	Gypsum	65.8
Redcliff	22.6	Glnwd. Springs	90.8

Glenwood Springs-Rangely.

	Miles		Miles
Glnwd Springs	0.0	Meeker	75.9
Rifle	33.4	Rangely	136.9

Rangely-Colton.

	Miles		Miles
Rangely	0.0	Roosevelt	89.7
K Ranch.....	22.0	Duchesne	121.9
Vernal	57.3	Colton	172 5

Colton-Salt Lake City.

	Miles		Miles
Colton	0.0	Provo	57.8
Thistle	33.7	Alpine	71.5
Spanish Forks.	47.0	Salt Lake City	103.1

Salt Lake City—Snowville.

	Miles		Miles
Salt Lake City.	0.0	Honeyville	73.9
Ogden	37.9	Blind Springs..	89.8
Brigham City..	60.1	Snowville	117.3

Snowville-Wells.

	Miles		Miles
Snowville	0.0	Montello	111.6
Lucin	94.2	Wells	166.2

Wells-Battle Mountain.

	Miles		Miles
Wells	0.0	Carlin	79.6
Deeth	20.5	Richmond Mine	96.9
Elko	56.4	Battle Mtn.....	133.0

Battle Mountain-Lovelock.

	Miles		Miles
Battle Mtn.....	0.0	Mill City.....	85.6
Golconda	40.0	Humboldt	99.2
Winnemucca...	57.0	Lovelock	132.4

Lovelock-Truckee.

	Miles		Miles
Lovelock	0.0	Verdi	119.7
Wadsworth ...	75.8	Truckee	143.1
Reno	107.8		

Truckee-Sacramento.

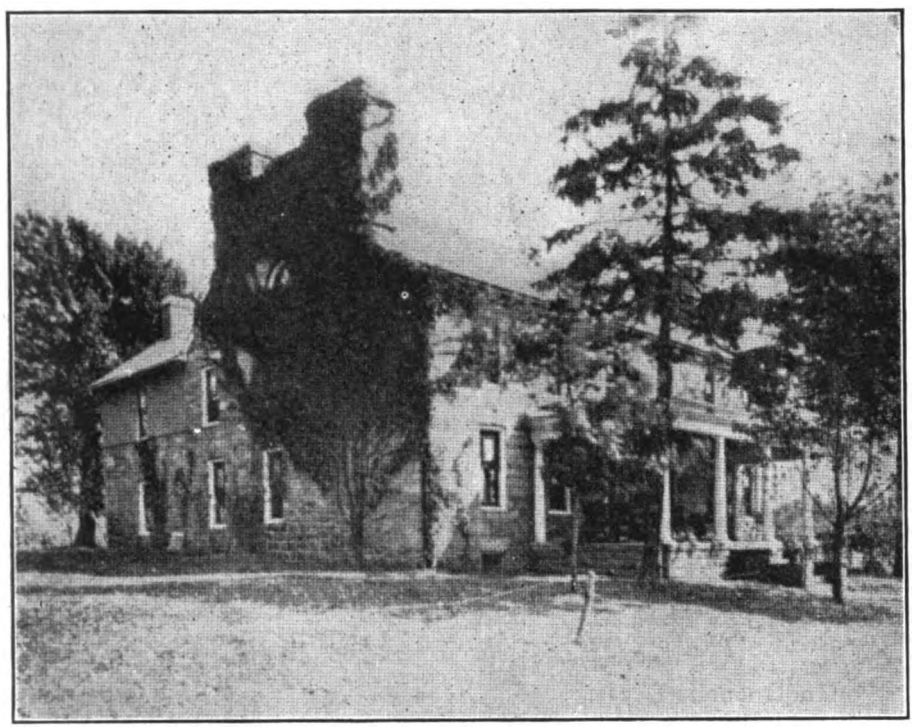
	Miles		Miles
Truckee	0.0	Auburn	76.5
Emigrant Gap.	32.6	Folsom	95.6
Colfax	58.5	Sacramento ...	117.4

Sacramento-San Francisco.

	Miles		Miles
Sacramento ...	0.0	Livermore	95.1
Lodi	36.6	Oakland	130.7
Stockton	52.4	San Francisco.	136.2

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NATIONAL OLD TRAILS



Old Stone House Near Brownsville.

FOLLOWING the National Old Trails the tourist goes through the heart of the country, from ocean to ocean, if he makes the complete itinerary, or he may branch off to roads leading to almost any part of the United States. From all angles of interest, this transcontinental highway, with termini at Washington, Baltimore and Los Angeles, enjoys great popularity among tourists.

From New York to Philadelphia the Lincoln Highway is followed. The route then turns southward, running along the Delaware river to Wilmington, thence through Elkton across the Susquehanna river to Bel Air, about 25 miles out of Baltimore. From Baltimore to Washington, a distance of about 39 miles, the route is over the road once known as the "Washington Road," which was traveled by stage coaches in the colonial days. Beyond Beltsville the Maryland agricultural station and the government aviation grounds are passed and a number of excellent examples of colonial architecture in old residences are seen.

The section is rich in historical interest, and the tourist visits scenes of important events that occurred in both the Revolution and the Civil wars. Upon entering Washington he will be tempted to stay over the allotted time. A full week is not too much to spend in inspecting the various government buildings and institutions. A ride around the principal avenues in the section of the Capitol and White House before leaving will suffice to give one a good idea of the layout of the city and the magnificent specimens of architecture.

Drive Is Entrancing.

The drive out of Frederick, Md., is entrancing, passing out of Wisconsin avenue among beautiful buildings and estates with well kept grounds. One place of particular interest is the section of the road from District of Columbia boundary line to Rockville, which is maintained by the government as an experimental highway for determining the qualities of different kinds of surfacing. The various kinds of materials used in the sections are designated by signs placed along the roadway.

Between Urbana and the Monocacy river is the battlefield of Monocacy, where General Lee Wallace and his command were defeated by the Confederate soldiers under General Jubal Early in 1864.

Frederick, Md., was one of the main strategic points in the war for freedom, and during the Civil War was occupied by the Confederate soldiers. Thomas Johnson, the first state governor of Maryland, who nominated George Washington as commander of the American armies, had his summer home on Rose Hill, which lies on the outskirts of the city. A stone freight house of the Baltimore & Ohio railroad, said to be the oldest in the world, is also located in Frederick. In crossing over Carroll's creek an inscription will be noticed on the bridge marking the spot where, legend says, Barbara Fritchie lived.

On the road from Frederick to Braddock Heights the mountains come into view for the first time and very soon the ascent of Catoctin mountain begins. In less than two miles the road rises about 460 feet between Braddock Village and Braddock Heights. From the latter elevation a beautiful view of all the surrounding country may be obtained, particularly South Mountain battlefields and the War Correspondents memorial arch.

Through Historic Places.

In Middletown, the next closely built up place, is the old home of Commodore Geisinger, who fought naval battles with the pirates at Tripoli and Algiers. Beyond this point the road rises precipitately again. Beyond the stone Catholic church on South Mountain, which is reached through Turner's Gap, there are a number of memorial tablets, on which a description is given of the movements of the opposing armies across the mountain.

Between South Mountain and Hagerstown, beyond Boonsboro, there is a short cut to Sharpsburg, from which place the Antietam battlefield may be reached. Hagerstown is the center of a number of trunk highways extending North, South, along the Chesapeake & Ohio canal and Potomac river for a distance of 10 miles to Hancock, where it turns northward across the mountains. The country between these two points becomes a beautiful panorama of exquisite scenery to the rapidly moving tourists.

The intervening distance, about 40 miles to Cumberland, is the most picturesque part of the entire trip. While the roads wind around like a path in a maze and goes up and down the most precipitous grades of any well traveled thoroughfare in the country, it is easily followed. Out of Hancock the route leads up and over Tonoloway ridge, and further on over Sideling hill, where there is an ascent of 760 feet in a mile and a half. Down the other side of this range there is a descent of 495 feet in one mile.

Short Turns and Peaks.

The roads through this section are curved and contain many short turns, consequently, the motorist should drive very carefully, as while no danger exists to the machine that is under control, fast or reckless driving would be very foolish. Before the ascent of Town Hill, which is the next peak to be negotiated, some of the most beautiful scenic effects of the entire trip throughout the mountains become visible. The environment seems quiet and peaceful, as there is little evidence of habitation in view and one can see great distances into the mountains and across valleys and low plains. Coming down the west slope of Green Ridge, which is the next high elevation on the road, one of the largest

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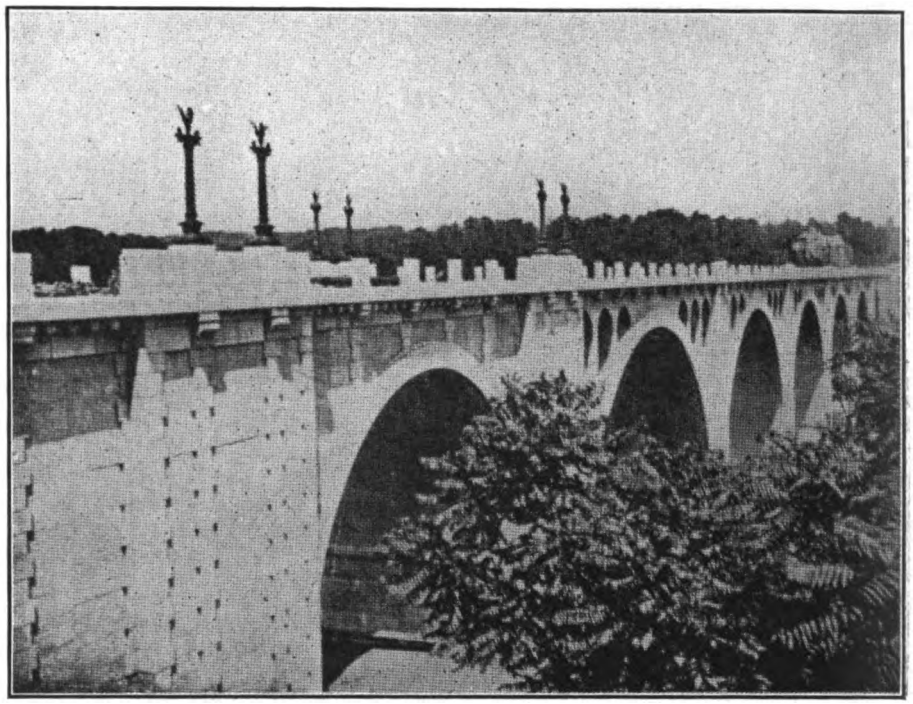
cultivated apple orchards in the United States comes into view. There are nearly 50,000 trees in this orchard. Descending into the valley of Fifteen Mile Creek, Polish mountain looms in the distance, across a great ravine, extending as far as the eye can see to the north and south.

Climbing Martin Mountain.

Passing on through Gilpin and into Flintstone, there is a hotel 108 years old, formerly known as the "Piper House," which looks little the worse for wear of the elements. A few miles out of Flintstone the ascent of Martin Mountain begins, during which a rise of 535 feet in a little over a mile is made to the summit, 1720 feet above the sea level. Down the west slope the road leads through the valley into Cumberland on the Potomac river, the center of transportation of that section. This city is about half way between Washington and Wheeling and is a convenient stopping place on the third night out, as it affords good hotel accommodations.

From Cumberland to Wheeling the distance is about the same as that traveled on the previous day and the route leads through the section which became prominent historically during the French and Indian war. This section was entirely constructed at the expense of the government. As far as Uniontown, which is half way to Wheeling, the road continues through the mountainous country, attaining much higher altitudes, however, the elevation at the summit of Big Savage Mountain being 2880 feet and at Meadow Mountain 2792 feet. A few miles out of Farmington, close by the road, is the site of "Fort Necessity," where during the French and Indian war George Washington was forced to surrender his command.

The remainder of the road into Uniontown is through a heavily wooded section. There are many old taverns in this quaint town and it also contains many land marks nearly a century old. Twelve miles from Uniontown is Brownsville, on the Monongahela river, and 15 miles further on, Washington, which is the nearest point on the National road to Pittsburgh.



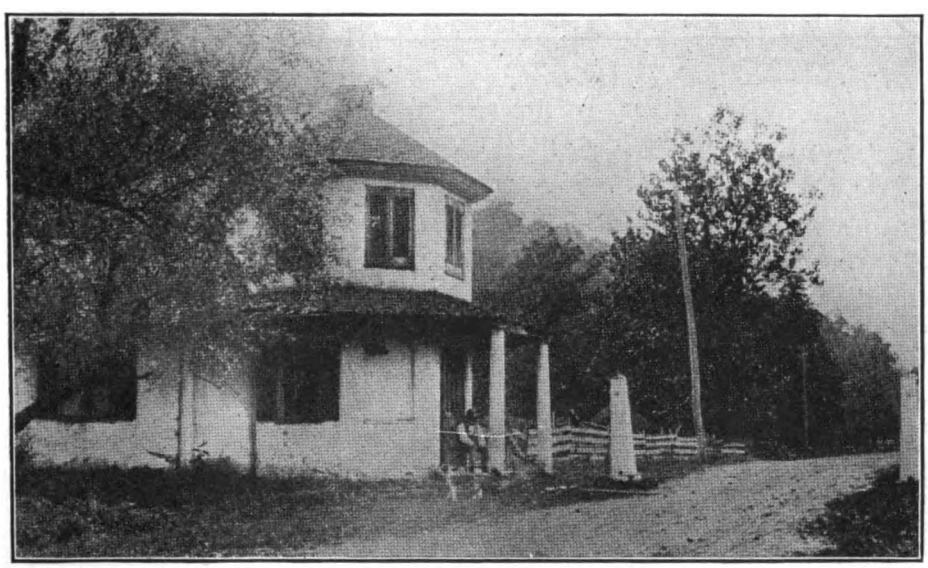
Bridge Over Rock Creek on Connecticut Avenue Route Out of Washington, Toward Rockville and Frederick.

Now the Ohio Valley.

The route from Washington to Wheeling is mostly down hill and crosses the panhandle of West Virginia into the valley of the Ohio river. West of this point lays the great level farming lands and prairies that the pioneers of over 100 years ago sought after traveling over the National road to the Ohio river, and there is today an enormous amount of travel East and West through the city; more, probably, than through any other city of its size in the United States.

Here the Ohio river is crossed into Ohio. There is now an unbroken stretch of brick paving 16 feet wide through Zanesville to Columbus.

From Columbus to the Indiana state line, on the old National road, there is much brick paving and from there on to St. Louis rough dirt roads, about the worst of the trip, are encountered.



Toll House Six Miles West of Cumberland

At Booneville, Mo., the third of the old trails, the Santa Fe, begins and continues through Kansas City, across Kansas and a corner of Colorado, through New Mexico to Santa Fe.

Westward, Ever Westward.

Over excellent roads, through the wonderful Kansas wheat fields, the route goes west across the state. The Colorado line is crossed between Coolidge, Kan., and Holly, Col. The route crosses the Arkansas river at La Junta and shortly crosses the New Mexico line to Raton, to which it goes down through the Raton pass.

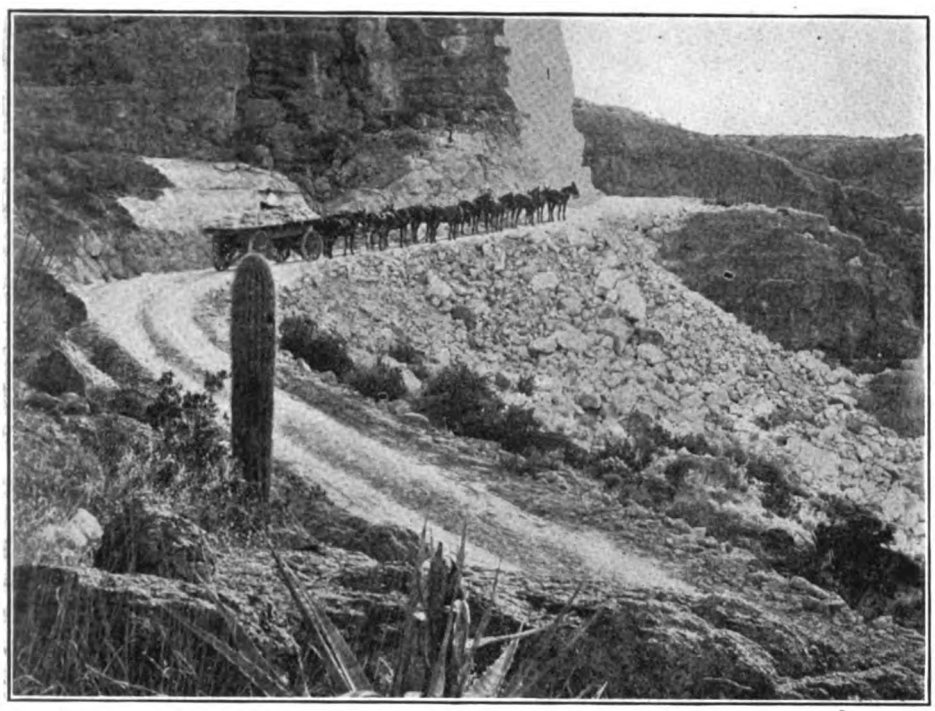
The Marvelous Southwest.

The tourist first breaks into the real land of enchantment in leaving Raton, N. M., en route for Santa Fe. There is the wonderland of wonderlands with more marvelous scenic features than exist anywhere in the world. Even the atmosphere has its own peculiar charm, being rare and dry, although stimulating in its effect upon the senses.

This is Pueblo country and the Pueblo Indians, unlike their brethren of the red skin, abjured all the advances of the white man to change their modes, dress, speech, customs and religions. They still adhere to the same type of abode and manner of eating and dressing as was handed down to them by their forefathers who met the Spanish and French explorers that came into their country over 300 years ago. The nondescript is present on every hand and the further into this maze of marvels the traveler goes the more unexpected becomes the expected.

Santa Fe and the country immediately about the city is worthy of a stop over of several days and for an even longer period if one delights in delving into ancient lore. La Ciudad Real dela Santa Fe de San Francisco, as Santa Fe was called when it was founded by the Span-

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Scenery in Arizona.

iards in 1605, 150 years before the United States became a nation, was a settlement, dating back into antiquity. For this reason it is now the leading center of archaeological research in the United States and a school and museum of the American Institute is maintained there. It is in an old palace which has housed 76 rulers of Mexican and Spanish blood and 19 American territorial governors.

Grand Canyon of Arizona.

Passing into Arizona the first of the great sights of the southwest that is encountered is a section of the Petrified Forest. This is looked upon as one of the chief marvels of the world. It is spread over several large tracts, the first of which is encountered six miles out of Adamana. Three miles further on is the second forest and the third and the largest is 13 miles southwest of Adamana. There are two others, the Blue Forest and the North Sigillaria. The first named is seven miles southeast of Adamana and the latter nine miles north of that place.

Leaving Flagstaff the tourist takes the highway northward, a distance of 79 miles to Grand View Point, which is located on the rim of the canyon, where one of the most wonderful views of the region is to be had. From this point the highway runs through a winding course for 14 miles along the rim of the canyon to Eltovar Hotel, where another wonderful view is visible. From the latter point the highway turns southward again and joins the main transcontinental highway at Williams.

Across the Mojave desert, once a great graveyard for travelers and their animals, a fine modern road, costing $10,000 to $15,000 a mile, has been built. It is kept oiled most of the way and alkali dust is scarce on the run of 165 miles, which can be made at better than 20 miles an hour by almost any car. There are stations, too, where car supplies and food may be purchased. From Barstow, on the western side of the desert, it is a run of 78 miles to San Bernardino. El Camino Real, from San Diego to the north, connects the old Spanish missions, rare specimens of a distinctive architecture, with each other. Los Angeles is 68 miles from San Bernardino.

California is noted for its splendid highways, which always delight every motorist from the East. There are a great number of points of interest in southern California, and the tourist may spend a number of days in the vicinity of Los Angeles without fear of monotony.

ITINERARY.

NATIONAL OLD TRAILS ROAD.

Night Stops—New York City, Philadelphia, Washington, D. C.; Cumberland, Md.; Wheeling, W. Va.; Columbus, O.; Indianapolis, Terre Haute, Ind.; St. Louis, Columbus, Mo.; Kansas City, Emporia, Hutchinson, Dodge City, Syracuse, Kan.; La Junta, Trinidad, Col.; Las Vegas, Santa Fe, Albuquerque, McCarty's, Gallup, N. M.; Holbrook, Flagstaff, Kingman, Ariz.; Amboy, San Bernadino, Los Angeles, Santa Barbara, Pasa Robles, Santa Cruz, San Francisco, Cal. Thirty-one Days, 3726 Miles.

New York-Philadelphia.

	Miles		Miles
New York.....	0.0	Monmouth Jct.	46.8
Jersey City....	6.3	Trenton	63.4
Newark	12.2	Oxford Valley.	70.0
Elizabeth	18.0	Hulmeville	73.6
Rahway	23.1	Andalusia	78.9
Iselin	27.4	Torresdale	81.1
Metuchen	31.4	Holmesburg ...	83.4
New Brunswick	36.0	Philadelphia ..	95.6

Philadelphia-Washington.

	Miles		Miles
Philadelphia ..	0.0	Perryville	60.9
Darby	6.3	Webster	66.6
Glendolen	8.2	Churchville ...	70.5
Norwood	9.3	Belair	76.3
Eddystone	12.5	Kingsville	83.5
Chester	13.6	Carney	89.7
Marcus Hook..	18.5	Baltimore	100.4
Claymount	20.1	Elkridge	109.4
Holly Oak.....	21.2	Laurel	121.4
Wilmington ...	26.4	Contee	123.4
Elsemere Jct..	29.5	Beltsville	126.9
Marshalltown..	32.0	Hyattsville ...	133.4
Newark	40.0	Bladensburg ..	133.9
Elkton, Md....	46.6	Washington ...	139.4

Washington-Cumberland.

	Miles		Miles
Washington ...	0.0	Benevola	62.7
Bethesda	7.4	Hagerstown ...	70.7
Rockville	15.3	Hancock	97.7
Gaitherburg ...	20.5	Bellegrove	110.7
Clarksburg ...	28.5	Piney Grove...	114.7
Hyattstown ...	32.4	Pratt	122.7
Frederick	43.7	Gilpen	125.7
Middletown ...	51.7	Flintstone	126.7
Boonsboro	59.7	Cumberland ...	139.7

Cumberland-Wheeling.

	Miles		Miles
Cumberland ...	0.0	Summit	56.0
Frostburg	11.0	Uniontown	62.0
Grantville	25.0	Brownsville ..	74.0
Keyser Ridge..	31.0	Scenery Hill...	86.0
Addison	36.0	Washington ...	99.0
Somerfield	40 0	Claysville	109.0
Farmington ...	50.0	Wheeling	132.0

Wheeling-Columbus.

	Miles		Miles
Wheeling	0.0	Norwich	60.5
Bridgeport	1.2	Zanesville	72.4
St. Clairsville..	10.9	Sterling	80.5
Lloydsville	16.1	Brownsville ..	86.3
Morristown ...	19.9	Linnville	91.0
Hendricksburg	25.6	Jacktown	95.0



Highway Passing Through the Hills.

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Fairview	29.0	Hebron	99.0
Washington	40.6	Kirksville	105.0
Cambridge	49.0	Etna	111.6
New Concord	57.3	Columbus	128.1

Columbus-Indianapolis.

	Miles		Miles
Columbus	0.0	Dayton	67.8
Alton	9.4	New Lebanon	78.3
W. Jefferson	14.4	Johnsville	80.2
Lafayette	21.8	W. Alexandria	86.2
Summerford	26.5	Eaton, O	91.7
Brighton	30.3	Richmond, Ind	107.6
Vienna	32.9	Centerville	113.7
Harmony	37.5	Cambridge City	123 0
Springfield	43.4	Lewisville	132.8
Enon	51.2	Knightstown	142.2
Fairfield	57.4	Greenfield	155.2
Harshman	63.7	Indianapolis	176.4

Indianapolis-Terre Haute.

	Miles		Miles
Indianapolis	0.0	Coatsville	40.0
Bridgeport	9.0	Reelsville	45.9
Plainfield	13.8	Harmony	51.8
Belleville	18.7	Brazil	54 9
Stilesville	26.9	Seeleyville	62.5
Mt. Meridan	33.9	Terre Haute	70.4

Terre Haute-St. Louis.

	Miles		Miles
Terre Haute	0.0	Vandalia	100.2
Marshall, Ill	16.8	Hagerstown	104.5
Martinsville	27.6	Mulberry	111.3
Casey	33.9	Greenville	120.0
Greenup	43.7	Pocahontas	130.0
Teutopolis	62.1	Highland	139.0
Effingham	66.0	Colinsville	160.0
Altamont	80.4	St. Louis, Mo	172.0

St. Louis-Columbia.

	Miles		Miles
St. Louis	0.0	Warrenton	65.9
Wellston	6.4	Jonesburg	75.7
Pattonville	14.4	Danville	88.7
St. Charles	19.8	Mineola	91.4
Colterville	30.8	Calwood	109.1
Wentzville	45.1	Fulton	117.0
Fortistell	52.1	Millersburg	128.1
Wright	56 6	Columbia	140.7

Columbia-Kansas City.

	Miles		Miles
Columbia	0.0	Dover	103.5
Rocheport	14.4	Lexington	114.5
New Franklin	30.1	Wellington	121.8
Boonesville	33.1	Levasy	132.3
Arrow Rock	53.6	Independence	150.2
Marshall	70.5	Centropolis	154.4
Waverly	92.3	Kansas City	159.2

Kansas City-Emporia.

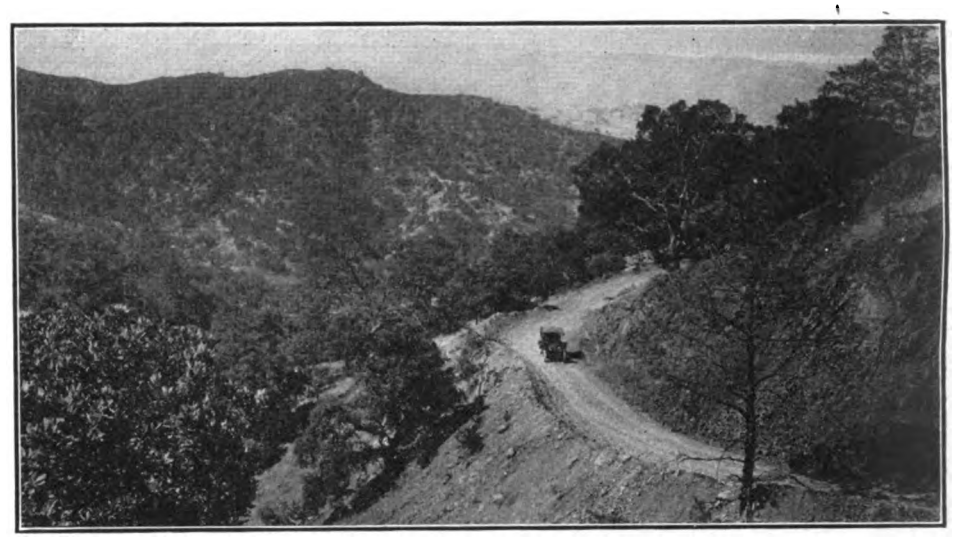
	Miles		Miles
Kansas City	0.0	Ottawa	71.2
Martin City	16.4	Williamsburg	88.4
Olathe	28.8	Waverly	101.5
Edgerton	46.7	Emporia	134.1

Emporia-Hutchinson.

	Miles		Miles
Emporia	0.0	Florence	48.8
Cottonwood	21.8	Peabody	63.7
Elmdale	28.0	Halstead	95.2
Clements	35.7	Hutchinson	122.3

Hutchinson-Dodge City.

	Miles		Miles
Hutchinson	0.0	Great Bend	68.0



A Road in California.

Sterling	24.9	Kingsley	115.7
Lyons	34.4	Spearville	137.7
Chase	44.1	Dodge City	154.8
Ellinwood	57.6		

Dodge City-Syracuse.

	Miles		Miles
Dodge City	0.0	Lakin	78.1
Colmarron	19.2	Kendall	95.0
Ingalls	26.2	Syracuse	107.4
Garden City	53.0		

Syracuse-La Junta.

	Miles		Miles
Syracuse	0.0	Prowers	65.4
Holly	22.0	Las Animas	93.7
Granada	39.7	La Junta	115.5
Lamar	57.3		

La Junta-Trinidad.

	Miles		Miles
La Junta	0.0	Kadrew	76.2
Timpas	23.3	El Mora	87.6
Thatcher	54.8	Trinidad	91.3

Trinidad-Las Vegas.

	Miles		Miles
Trinidad	0.0	Springer	69.7
Raton, N. M	25 4	Wagon Mound	97.6
Maxwell	54.1	Watrous	120.5
French	58.9	Las Vegas	141.0

Las Vegas-Santa Fe.

	Miles		Miles
Las Vegas	0.0	Pecos	49.5
Tecolote	12.0	Glorieta	55.6
Bernal	18.2	Canoncito	60.0
Pajarita	40.5	Santa Fe	75.2
Rowe	42.8		

Santa Fe-Albuquerque.

	Miles		Miles
Santa Fe	0.0	Sandia	52.5
Domingo	26.9	Alameda	58.7
Algodones	41.2	Albuquerque	66.7

Albuquerque-McCarty's.

	Miles		Miles
Albuquerque	0.0	Casa Blanca	55.1
Atrisco	3.3	McCarty's	82.2
Laguna	48.3		

McCarty's-Gallup.

	Miles		Miles
McCarty's	0.0	Thoreau	43.0
Grant's	13.0	Gonzales	50.0
Totoc	17.0	Guam	54.0
Bluewater	25.0	Peres	58.0
Baca	33.0	Wingate	64.0
Chaves	40 0	Gallup	76.0

Gallup-Holbrook.

	Miles		Miles
Gallup	0.0	Pinto	88.0
St. Michael's, Ariz	26.0	Petrified Forest	102.0
Wide Ruins	56.0	Currizio	111.0
Navajo	81.0	Holbrook	124 0

Holbrook-Flagstaff.

	Miles		Miles
Holbrook	0.0	Tolchaco	75.4
Winslow	36.0	Flagstaff	117.0
Leupp	64.6		

Flagstaff-Kingman.

	Miles		Miles
Flagstaff	0.0	Pica	101.0
Riorden	7.0	Yampai	106.0
Bellemont	12.0	Field's Station	108.0
Maine	20.0	Peach Springs	120.0
Chvlender	24.0	Cherokee	126.0
Williams	36.0	Truxton	132.0
McClellan	44.0	Valentine	139.0
Ash Fork	56.0	Hackberry	144.0
Pineveta S'tion	64.0	Antares	151.0
Crookton	69.0	Husipai	158 0
Seligman	81.0	Louise	172.0
Chino	85.0	Kingman	174.0

Kingman-Amboy.

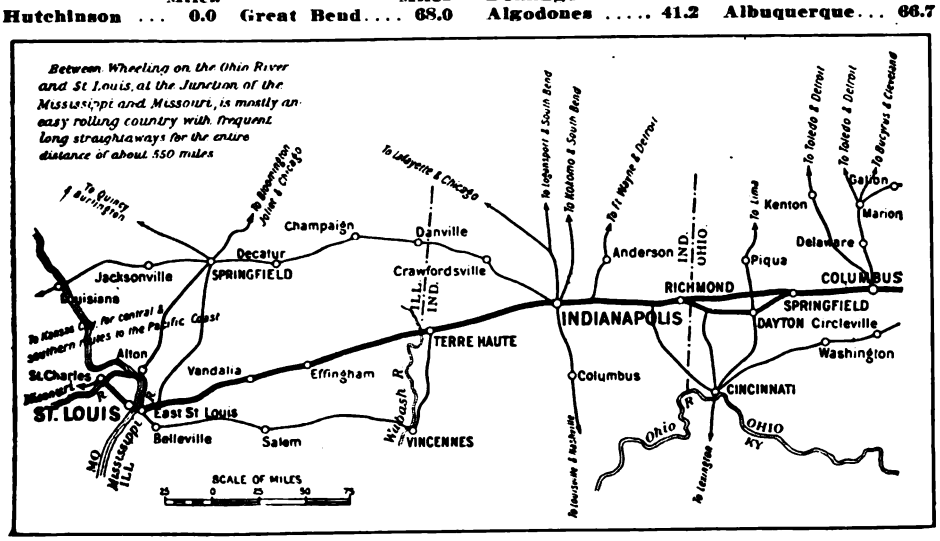
	Miles		Miles
Kingman	0.0	Homer	94.0
McConico	4.0	Goff's	102.0
Yucca	25.0	Fenner	111.0
Topcock	55.0	Danby	127.0
Needles	71.0	Cndix	140.0
Klinefelter	83 0	Amboy	154.0

Amboy-San Bernadino.

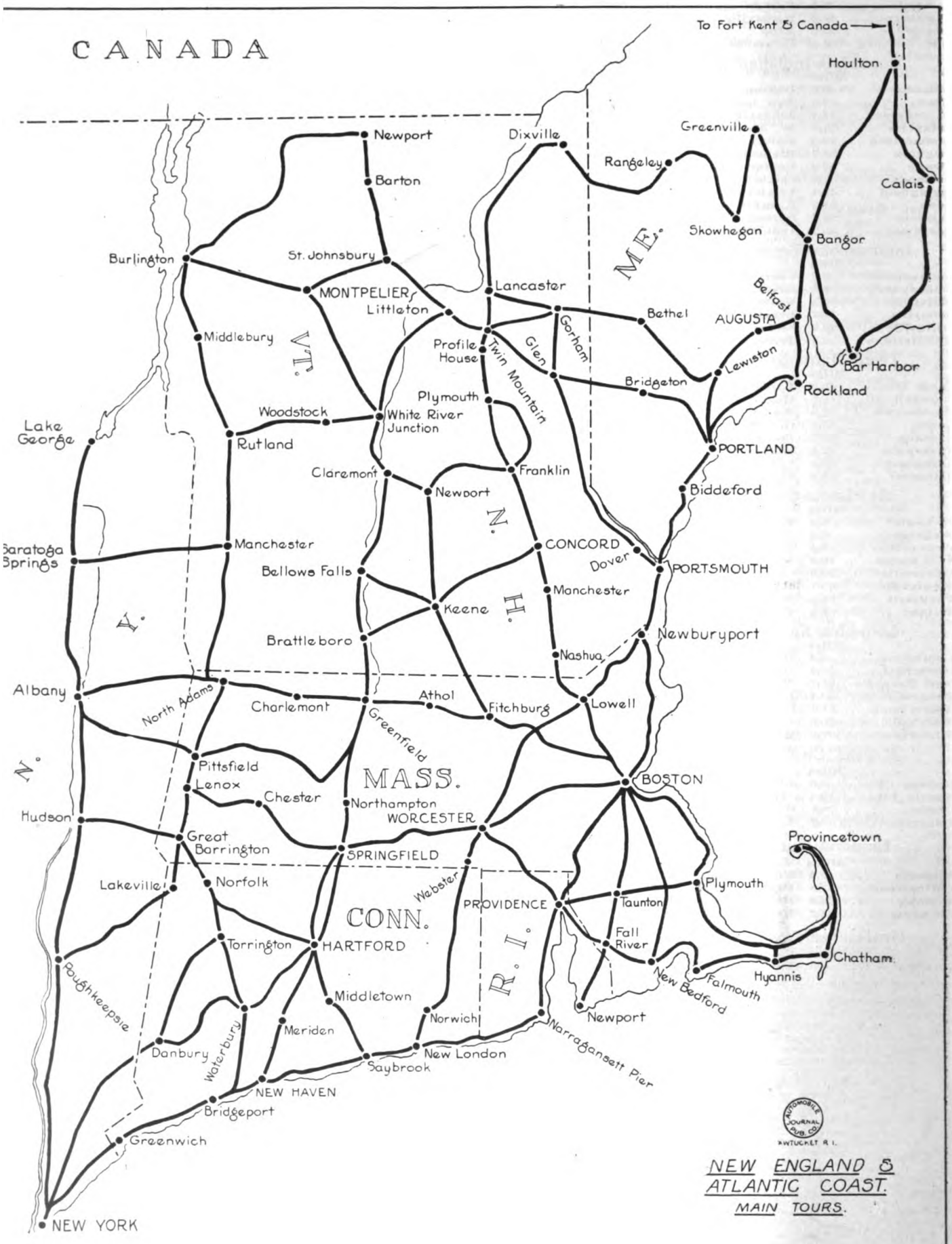
	Miles		Miles
Amboy	0.0	Todd	88.0
Bagdad	7.0	Hicks	94.0
Ash Hill	21.0	Hellen	103.0
Ludlow	28.0	Oro Grade	113.0
Lavic	37.0	Victorville	119.0
Pisgah	42.0	Hesperia	127.0
Hector	47.0	Cajon	140 0
Newberry	61.0	Devore Store	142.0
Mineola	67.0	Devore Store	149.0
Daggett	73.0	Vermont	151.0
Barstow	82.0	San Bernadino	160.0

San Bernadino-Los Angeles.

	Miles		Miles
San Bernadino	0.0	Pomona	46.8
Riverside	10.9	Lemon	54.8
Bloomington	18.7	San Marino	72.7
Etiwanda	30.9	Le Senda	74.7
N. Cuckamonga	34.9	Pasadena	79.1
Upland	38.5	Los Angeles	89.9



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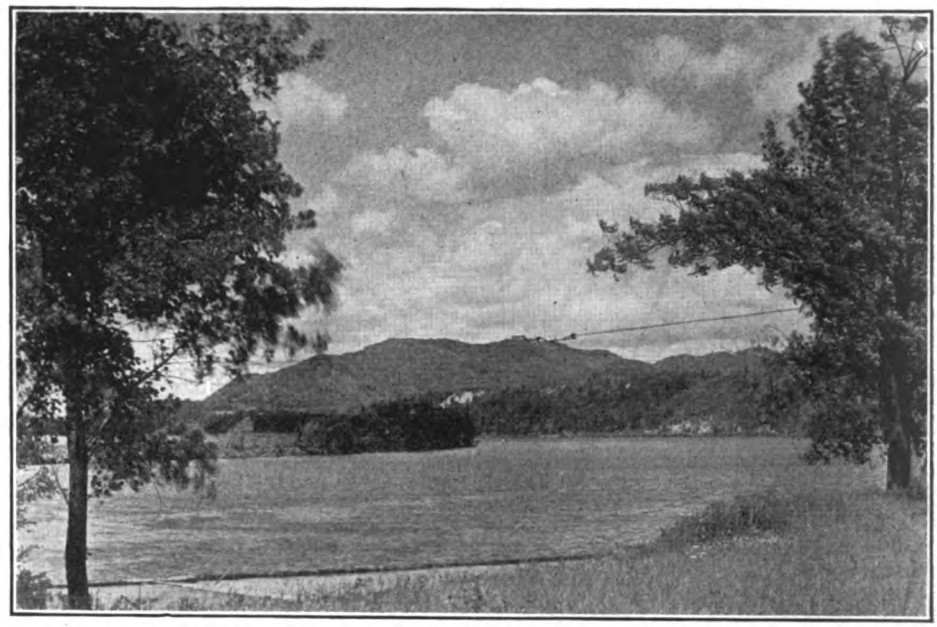


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TOURING NEW ENGLAND

By Leon A. Dickinson.

TO NEARLY every one the task of planning a vacation is beset with numerous difficulties. The seashore provides bathing, but is nearly always hot; while the mountains are cool, but too often are devoid of opportunities for boating, bathing and fishing. How much more difficult must it be for the harassed motorist who starts to lay out his annual vacation tour! First, there is the question of roads. Good roads are jewels, but the flawless ones are few and far between. Moreover, what may be a very good road today is too often torn up and impassable tomorrow. Highway construction with its attendant detours may be necessary, but it certainly does cause the motorist a deal of trouble. It is the irony of fate that most detours are always encountered in the very hottest weather, and none at all in winter when the weather is too cold to permit extensive touring.



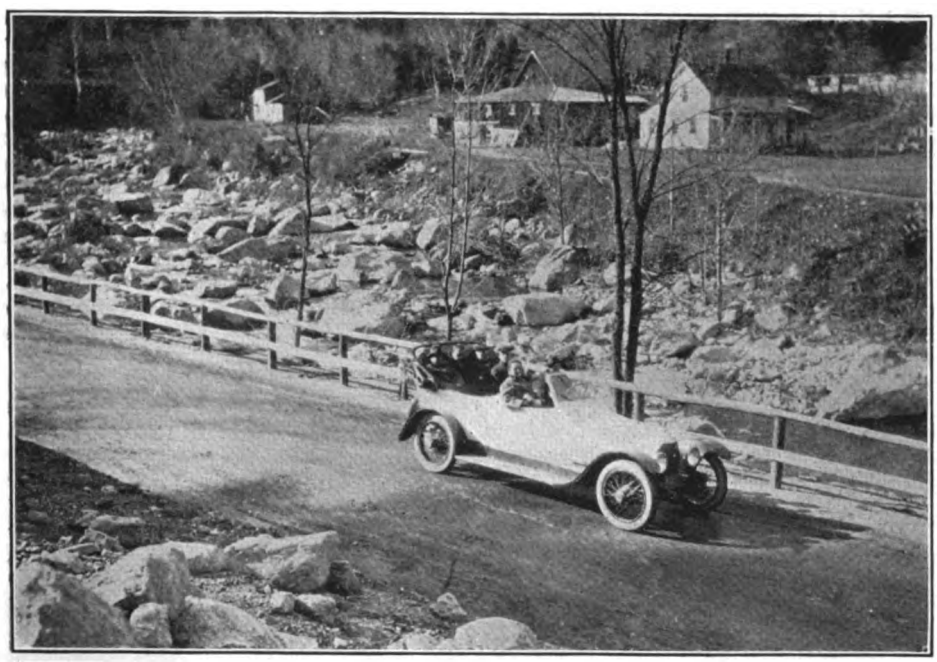
Connecticut River and Mount Holyoke, Smith's Ferry, Mass.

Question of Hotels.

Then, too, there is the question of hotels, scarcely secondary in importance to that of roads. The best hotels open late and close early, while during their season they are usually overcrowded. Thus it is frequently necessary for the motorist "en tour" to put up with accommodations which are either a joke or a tragedy, according to his disposition or digestion.

Bearing these things in mind it is readily seen that the pathway of the prospective tourist is not necessarily strewn with roses. On the contrary, if he starts on his tour without first securing advice from some competent source his trail may well be marked with anathemas and blown out tires. It is vital that he choose for his tour a region where he is certain to find good roads and satisfactory hotel accommodations at convenient intervals. After this come the questions of diversification of scenery and historic associations. A well planned tour should include as much variety of scenery as possible for the sake of avoiding repetition, which may become monotonous. All mountains are beautiful, but too much hill climbing is bad for both car and occupants. Occasional glimpses of the ocean are inspiring, but a long trip of many miles along any seacoast is certain to become tedius after a while.

The ideal region for automobile touring is one which will enable the motorist to visit rugged mountains and fertile plains, ocean beaches and inland lakes, all within the relatively narrow time limits of one to two weeks. The only region which complies satisfactorily with all these rigid requirements is New England. I submit this, not as a personal opinion, but rather as a categorical statement of fact.



Picturesque Gorge at Foot of Hoosac Mountain.

New England's Offerings.

There may be those who still doubt and perhaps dispute it, but opposition must surely turn to acquiescence in the end. Let us consider for a moment what New England has to offer for the tourist's delectation. Just to enumerate a few of her natural treasures, there are, for mountains, the Berkshires, the Green Mountains and the White Mountains; for lakes, Sunapee, Winnipesaukee, Rangeley, Moosehead, Belgrade and Lake Champlain; for river valleys, the Connecticut, Naugatuck, Merrimack, Androscoggin and Kennebec, and, finally, as a grand and glorious climax, more than 1000 miles of the finest and most fascinating sea coast scenery to be found anywhere in the whole United States.

No wonder New England is proud of her scenery—has she not just cause to be? Nor is scenery all that she can boast of. Historically she has no peer, for the early history of New England is substantially that of the nation. What schoolboy does not know the story of Plymouth Rock, or the Boston Tea

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On the Mohawk Trail.

Party, Paul Revere's Ride, Lexington and Concord, Faneuil Hall, King Philip's War, Bunker Hill, the Charter Oak and Roger Williams. These are but few of the historic shrines which dot New England from one end to the other, endearing her forevermore to those of us who love our country and are proud of the achievements of our forefathers who created her.

It is no part of the purpose of this article to go into details concerning the various possible tours which may be taken throughout this wonderful region. These details are available for the asking at such fountain heads of information as the Touring Bureau of the American Automobile Association at 501 Fifth avenue, and other recognized authorities in such matters. Nevertheless, a general outline of some of the best automobile routes will not be amiss, since it will serve the desirable purpose of stimulating interest in a region which will repay the motorist many times over in the form of pleasant surprises and still pleasanter memories.

Recognized Trunk Routes.

There are several well recognized trunk routes in New England which if followed wholly or in part are certain to afford a full measure of satisfaction, not only as regards the primary requisites of roads and hotels, but also with respect to scenic and historic points of attraction. One of these is the Shore Road to Boston with its extension through Portsmouth and Portland and along the general line of the Maine coast to Bangor and Bar Harbor. This is a very popular route with motorists because of its almost universally excellent road surface, as well as the wealth of first class hotels which are to be found at very frequent intervals. It is not perhaps advisable to use this route throughout its entire length, owing to a certain similarity of scenery which is true for nearly all coast lines. Nevertheless one or more sections of it should be included in every tour which is taken in New England, such for instance as the stretch between Boston and Portland. Here, in a relatively few miles, are crowded some of the most charming bits of shore scenery to be found anywhere along the Atlantic coast. Salem, with its witchcraft legends; Gloucester, the quaintest of quaint fishing ports; Lynn, the premier shoe city of the country and home of the enormous plant of the General Electric Works; Portsmouth, with its naval station, and the beautiful beaches of Revere, Rye and York, are but a few of the many interesting places which abound along this popular highway.

Circuit of Cape Cod.

Another section of the trip along the Massachusetts coast is that which includes a circuit of Cape Cod. There is no other place quite like Cape Cod. It is an entity to itself and its almost complete absence of pretentiousness makes one feel at home from the very start. The old Cape Cod of song and story with its tales of hardy fishermen and seafaring men who wandered endlessly over the seven seas has gradually passed into oblivion. The chief business of Cape Cod today is raising cranberries and entertaining summer visitors and it has achieved success in both of these activities. The roads on Cape Cod are a never ending delight to the motorist and a wise and far seeing highway department takes good care that this enviable reputation which Cape Cod enjoys shall not be jeopardized.

The best way to reach Cape Cod from New York is to follow the shore road through New Haven and New London as far as Narragansett Pier and Saunderstown. Here there is a ferry which takes one across one section of Narragansett Bay to Jamestown Island and thence across the rest of the bay to Newport. This summer home of the ultra-fashionable contains many points of historic interest as well as the so-called "cottages" of its millionaire inhabitants. The Old Stone Mill, supposed by some to have been erected by the Norsemen; the old State House, which was built in 1739; the Perry House, home of Commodore Oliver H. Perry, following the battle of Lake Erie; the Redwood Library, which is believed to be the oldest library in the United States, and Trinity Church, dating back to 1725, are only a few of the historic shrines for which Newport is famous.

South Shore Route.

After Newport comes Fall River and New Bedford, two of Massachusetts' most prosperous manufacturing cities, and then, a few miles further on, Cape Cod itself. The route which is usually followed is that along the south shore of the cape through Falmouth and Chatham to Orleans and then back along the north shore to the home of the Pilgrim Fathers, Plymouth. Whoever motors this way should plan to stop for several hours at least in Plymouth. In addition to the famous Plymouth Rock there is Pilgrim Hall, which contains many interesting relics, memorials, antiques and works of art associated with early Plymouth history. Here also is the old graveyard containing the grave of Gov. William Bradford, and the Elder Brewster, as well as the ancient Howland House and Crow House, dating back respectively to 1666 and 1664. These two old houses are the only ones now remaining which were used by members of the Mayflower company.

Bay State Nearly Flat.

Another of the main traveled routes which affords an entirely different brand of scenery from that to be viewed along the shore is the one which follows the valley of the Connecticut river from the point where it empties into Long Island Sound almost in a straight line into the heart of the White Mountains. This broad and majestic river cuts straight through the heart of Connecticut and Massachusetts and then forms the boundary line between the states of New Hampshire and Vermont clear through to the Canadian border. The motorist from New York who decides to follow this route will run first along the shore of Long Island Sound to New Haven and thence almost due north, coming to the Connecticut river at Hartford, the capital of Connecticut. From this point the river is followed very closely, first on one side and then on the other nearly to the White Mountains, the route passing in succession through Springfield, Holyoke, Northampton, Greenfield, Battleboro, Bellows Falls, Claremont, White River Junction, Hanover and Woodsville. The



Road in Walpole, Mass.

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section of the Connecticut valley which is included in the state of Connecticut and Massachusetts is nearly flat or gently rolling for several miles on each side of the river, and hence as may well be imagined, extremely fertile. The soil in this region has been found to be peculiarly adapted to the raising of certain crops, particularly tobacco and onions. Enormous quantities of both of these products are produced here annually, and for mile after mile practically nothing else is grown. Beginning at Holyoke and running northeast for quite a number of miles there is a range of high hills or low mountains, known as the Holyoke Range, which looms high above the comparative flatness of the surrounding landscape. The view from Mount Tom, which is the southernmost peak of this range, is truly superb, because it affords an uninterrupted panorama throughout more than three-quarters of the surrounding horizon.

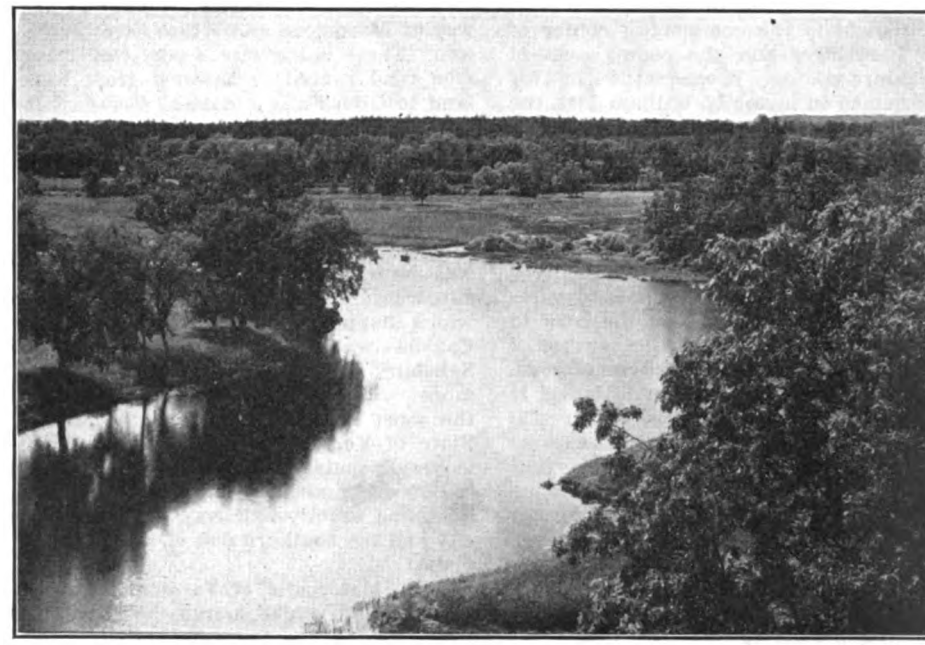
Branching off from this main trunk line at Greenfield is another route which is very popular with motorists, namely, that which runs north through Keene to Sunapee Lake and thence via Lake Winnipesaukee and Franconia Notch straight into the heart of the White Mountains. Although the road conditions are not quite as good on this route as those which prevail along the Connecticut river, this slight inferiority is more than compensated for by the surpassing beauty of the two lakes just mentioned. Each of these lakes is a veritable paradise for nature lovers and the shores of both are literally dotted with the camps and cottages of summer visitors. Canoes, motor boats and sail boats by the hundreds attest unmistakably the popularity of these lakes among lovers of aquatic sport and much of the time of those who spend their vacation at these lakes is spent either on or in the water.

Picturesque Run.

The third and last of the main north and south trunk routes which subdivide New England longitudinally and make it so easy of access for motorists from the south is that which includes the Berkshires and the Green Mountains and terminates at Burlington on the shore of the peerless Lake Champlain. By far the most picturesque run to the Berkshires from New York is through the western part of Connecticut via Danbury, Waterbury and Winsted, entering the Berkshires through Sheffield and Great Barrington. Danbury and Waterbury are widely known in the commercial world,



Highway Through the Litchfield Hills.



Glimpse of Nashua River, Nashua, N. H.

the former as the hat city and the latter as the home of the original Waterbury watch.

Many volumes have been written in description of the numerous points of scenic and historic interest which are centered in the Berkshires. This region has been famous for more than a century as a summer resort owing to its wonderful scenery and invigorating atmosphere. It remained for the advent of the automobile, however, with its necessary corrollary of good roads, to bring to this region the full popularity which its climate and unique location so richly deserves. Famous for all time for the historic associations which abound on all sides, the praises of the Berkshires have many times been sounded in story and song by writers whose names are household words.

The real entrance to the Berkshires from the south is Great Barrington. Here on Aug. 16, 1774, eight months before the Battle of Lexington, armed men prevented the crowned judges from holding court and defied English authorities in the Massachusetts province, this constituting the first open resistance to British rule in America. William Cullen Bryant practised law in Great Barrington from 1815 to 1825 and was town clerk there for several years.

In Stockbridge.

Next in order comes Stockbridge, universally acknowledged to be one of the loveliest villages in America. In the words of Beecher, it is "famed for its meadow-elms, for the picturesque beauty adjacent, for the quiet beauty of a village which sleeps along a level plain just under the rim of the hills." Stockbridge contains several buildings and monuments which have much historic interest. A memorial chime tower marks the spot where stood the Indian Mission Church, founded by Sargeant, while the old Sargeant House still stands on the Edward Hill estate. Jonathan Edwards, the greatest of America's metaphysicians, lived in Stockbridge for many years, and it was here that he wrote his famous treatise on "The Freedom of the Will." The site of the house where he lived is marked by a sun dial on the lawn of the Caldwell House. Another old house which possesses much interest is the historic Sedgwick Mansion, formerly the home of Catherine M. Sedgwick, the popular authoress. Here also is the birthplace of Cyrus W. Field, promoter of the first transatlantic cable. Monument Mountain, just south of Stockbridge and to the right of the main highway, commands a magnificent view of the Housatonic river for many miles, as well as of the whole Berkshire range.

Newport of Berkshires.

Lenox may justly be described as the Newport of the Berkshires, owing to the lavish display of wealth and luxury which is so much in evidence here. Numerous magnificent estates dot the surrounding landscape and are connected by a network of private roads, which are open to light horse drawn vehicles only. Among the most pretentious of these are the William D. Sloane and Charles Lanier places, which command a superb view; the Rathbone place, now owned by Mr. John Sloan; the Westinghouse place, with drives and walks of powdered marble, and the Stokes house, which was built around a great tree. Lenox was first settled in 1750 and received the family name of the Duke of Richmond. Fannie Kremble, the talented actress, had her summer home here for many years, and the "Perch," as it was called, still stands opposite the Foster mansion. Henry Ward Beecher used also to spend his summers in Lenox. Perhaps the most famous among the former residents of Lenox, however, was Nathaniel Hawthorne. Here, in a little red farm house near Stockbridge Bowl, or Lake Mahkeenoc, two miles to the southwest, the noted writer lived and worked for a year and a half. "The House of Seven Gables" and "The Wonder Book" were among the products of this versatile pen during that period.

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Historic Interest.

Pittsfield is the commercial center of the Berkshires and the county seat of Berkshire county. It was settled in 1752 and named in honor of William Pitt, the great English statesman. It contains a number of places of historic interest, among them being the quaint old Kellog place in East street, and the Appleton or Plunkett house, also in East street, where Longfellow wrote "The Old Clock on the Stairs." Oliver Wendell Holmes lived for some time at a small villa two miles to the south of the city, on the road to Lenox, while Herman Melville, author of sea tales, also lived on the same road. Several miles to the west of Pittsfield is the famous Shaker Village, which still contains a few of the quaint and curious sect called "Shakers," who were thus named because of their antics during their religious ceremonies in former days.

From Pittsfield the route which we are now considering, runs directly north to the town of North Adams. Located at the foot of the famous Housic Mountain, North Adams is a strategic point to motorists because it marks the beginning of the justly famous Mohawk Trail, which leads over the mountain to Greenfield. So well known has the Mohawk Trail become during the last two or three years that motorists now travel many miles to see it and a continuous stream of motor cars may be seen passing over this road almost any time of the day or night throughout the entire touring season. Turning to the west at North Adams the route leads through the picturesque town of Williamstown, the seat of Williams College. From this point it runs almost due north through Bennington, where occurred the historic battle of Bennington on Aug. 16, 1777, resulting in a decisive defeat of the British by the Continentals.

Best Golf Links.

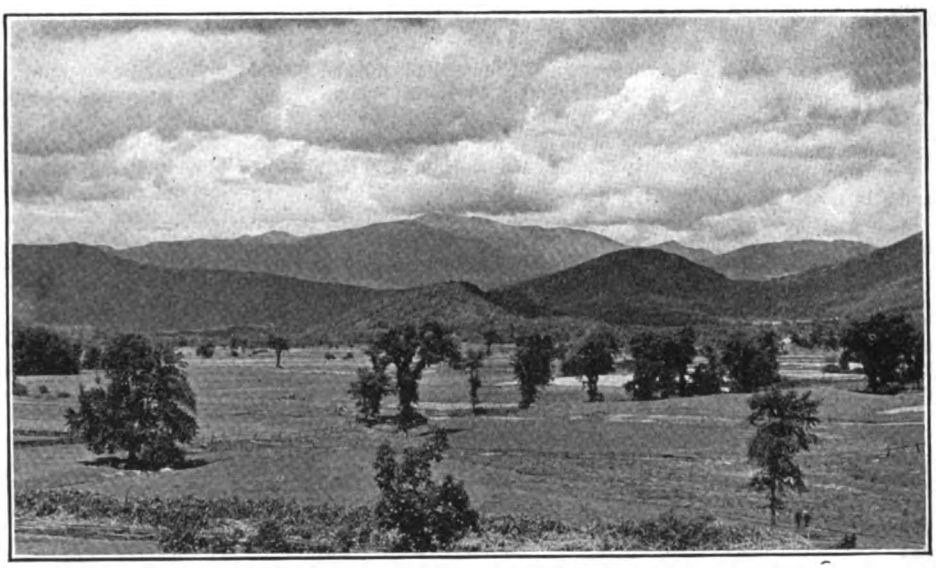
Next in order comes Manchester, where is located one of the best and most widely known golf links in the country. Many beautiful summer estates are located here and the town was made famous in former years by the visits of Mrs. Abraham Lincoln and Mrs. U. S. Grant.

Rutland, which is the next city of consequence on this route, is widely known as the center of the greatest marble producing region in the country. From the motorist's standpoint Rutland is important chiefly because it marks the point of intersection of two important trunk routes. It is here that the motorist must decide whether he intends to continue on to Burlington or else prefers to strike west toward the White Mountains by way of Woodstock and White River Junction. There is likewise a very well traveled road running southwest from Rutland to Glen Falls and Lake George. If he decides to continue north he will pass in succession through Brandon, Salisbury, Middlebury and Vergennes over a good gravel road straight to Burlington. Brandon contains the cottage in which Stephen A. Douglas of pre civil war fame was born, while Vergennes marks the site where the fleet on Lake Champlain which stopped the British invasion from Canada was fitted out. Just beyond Salisbury the route passes Lake Dunmore, which is noted as being one of the most beautiful lakes in the whole State of Vermont. Another lake which is very popular among summer visitors is Bomoseen, about 15 miles west of Rutland, and exactly half way between that city and the southern end of Lake Champlain.

Metropolis of Vermont.

Burlington, which marks the terminus of the route just described, as well as that which leads from the White Mountains, is the metropolis of Vermont and the principal port on Lake Champlain. Historically, it is noted chiefly as the home of Ethan Allen of Revolutionary days. Commercially, the city is important as a center of trade and commerce for that entire region, particularly as a market for lumber. All tourists, bound in either direction between the Adirondacks and the White Mountains must of necessity pass through Burlington, because it is here that the boat is taken across Lake Champlain to either Port Kent, Bluff Point or Plattsburg, on the New York side. It is not absolutely essential that the motorist take the boat at this point, because he has the option of driving north through the islands of Lake Champlain to the short ferry which plies between Isle La Motte and Chazy Landing. This latter trip is a very beautiful one, but, unfortunately, the road is not in very good condition, as compared with many of the other trunk routes in that vicinity.

Turning east from Burlington, the motorist who is bound for the White Mountains will run first to Montpelier, across the northern end of the Green Mountains, and then in a generally easterly direction through St. Johnsbury to the White Mountains. Undoubtedly, the mecca of all tourists in this section of New England is this same White Mountain range. Famous the country over as the premier tourist center of the East, it would be superfluous to attempt here any detailed description of this scenic wonderland. At least a week can very profitably be spent in visiting the numerous points of scenic and historic interest which abound within easy touring radius of this gem of nature's handiwork. The main route from the south enters the White Mountains via Franconia Notch, famous for its Flume and the Old Man of the Mountain, which has been immortalized by the brilliant pen of Hawthorne. The gateway from the east is Crawford Notch, while a short day's trip to the north is Dixville Notch, perhaps the most beautiful of all.



White Mountains, from Bethlehem, N. H.

Last to be mentioned, but by no means least from the motorists' standpoint, are the various resorts in the State of Maine. Space forbids more than a cursory mention of those which are best preferred by summer visitors. Poland Spring, Sebago Lake, Rangeley Lake, Moosehead Lake, Belgrade Lake and Bar Harbor are familiar words to tourists the country over. Maine is rapidly forging to the front as a motorists' playground and great strides have been made during the past two or three years in the way of putting the main traveled routes throughout the state in such shape as to attract the motor tourist. Maine's rugged coast line compares very favorably from a scenic standpoint with the far-famed fjords of Norway, while as a sportsman's paradise this region has no superior.

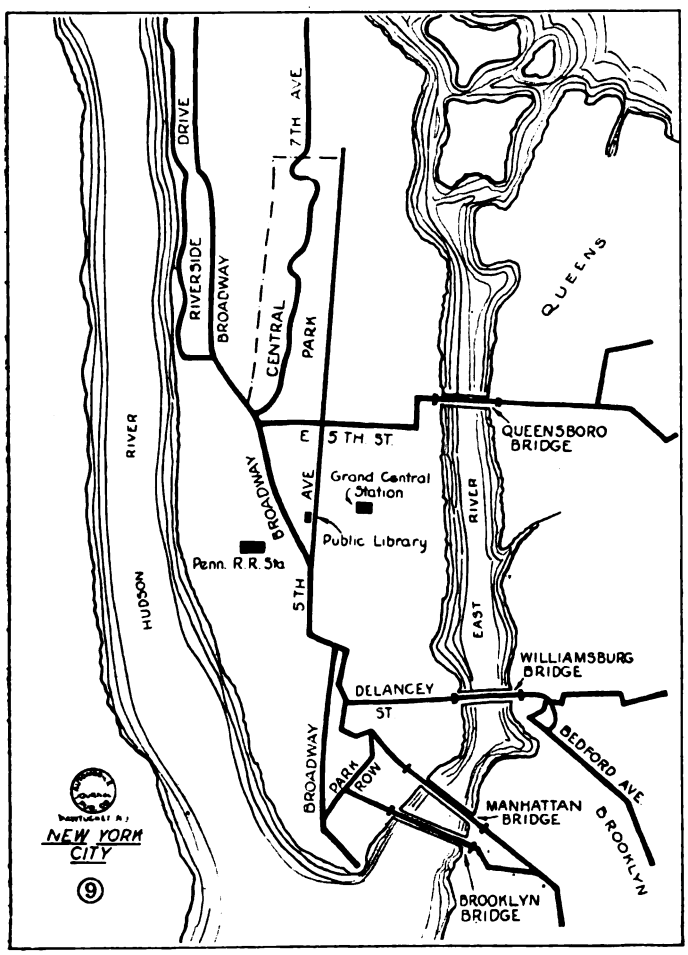
The subject is such a large one that it has been possible to touch only in a general way on the outstanding features of New England's numerous attractions for the motor tourist. Nevertheless enough has been said to substantiate, I think, the claim which I made in the beginning that this region has no peer as a summer playground.

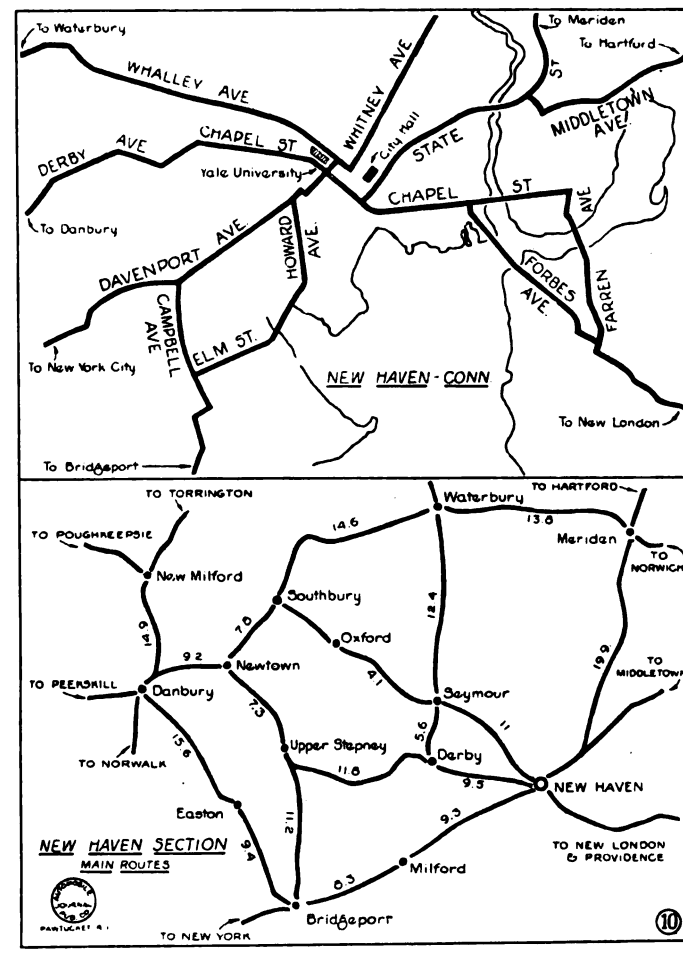
Great tributes are always paid to the wonderful scenery of New England. One writer stated:

"In short, within this northeasternmost corner of the United States, but one-third the size of France, the tourist may sample the mountain scenery of the Alps and the grandeur of the Rhine—the Italian lakes and the sun-kissed coast of Brittany."

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NEW ENGLAND ROUTES





NEW YORK TO BOSTON VIA NEW HAVEN.

New York-New Haven.

	Miles		Miles
New York	0.0	Norwalk	43.7
New Rochelle	18.0	Westport	47.0
Larchmont	19.8	Southport	51.3
Mamaroneck	21.4	Fairfield	52.8
Rye	25.2	Bridgeport	57.5
Portchester	26.9	Stratford	61.1
Greenwich	29.8	Milford	65.7
Stamford	35.0	New Haven	75.0
Darien	39.2		

New Haven-New London.

	Miles		Miles
East Haven	4.5	Westbrook	29.2
Brandford	7.5	Saybrook	33.4
Gilford	16.1	Lyme	36.7
Madison	21.0	Flanders	46.0
Clinton	24.9	New London	52.8

New London-Providence.

	Miles		Miles
New London	0.0	Wakefield	36.6
Groton	1.1	Narragansett	41.2
Mystic	7.7	Wickford	52.9
Stonington	10.7	East Greenwich	60.2
Westerly	17.0	Apponaug	62.7
Charlestown	28.8	Providence	72.7

Providence-Boston.

	Miles		Miles
Providence	0.0	Walpole	25.7
Pawtucket	4.3	Norwood	30.0
North Attleboro	12.3	Dedham	34.2
Plainville	14.0	Forest Hills	38.7
Wampum	17.4	Boston	44.2
Wrentham	18.9		

NEW HAVEN TO BOSTON VIA SPRINGFIELD.

New Haven-Hartford.

	Miles		Miles
New Haven	0.0	Meriden	19.9
North Haven	8.1	Berlin	26.1
Wallingford	13.5	Hartford	37.1

Hartford-Springfield.

	Miles		Miles
Hartford	0.0	Thompsonville	18.6
East Hartford	1.9	Long Meadow	22.2
Warehouse Pt.	13.4	Sjringfield	24.7
Enfield	17.5		

Springfield-Worcester.

	Miles		Miles
Springfield	0.0	Brookfield	32.9
N. Wilbraham	9.6	E. Brookfield	36.3
Palmer	15.7	Spencer	39.4
West Warren	24.0	Leicester	44.3
Warren	26.5	Worcester	50.5
W. Brookfield	30.2		

Worcester-Boston.

	Miles		Miles
Worcester	0.0	South Sudbury	23.0
Shrewsbury	5.5	Wayland	26.2
Northboro	10.0	Weston	29.7
Marlboro	15.8	Boston	43.5

NEW YORK TO DANBURY AND POINTS IN CONNECTICUT.

New York-Danbury.

	Miles		Miles
New York	0.0	Cross River	44.3
White Plains	23.4	South Salem	48.5
Armonk	31.3	Ridgefield	52.5
Bedford	39.3	Danbury	62.0

Danbury-New Haven.

	Miles		Miles
Danbury	0.0	Huntington	21.0
Bethel	3.4	Shelton	24.6
Dodgingtown	6.5	Derby	24.9
Stepney	14.7	New Haven	34.5

Danbury-Bridgeport.

	Miles		Miles
Danbury	0.0	Red Ridge	10.4
Bethel	3.4	Easton	16.3
Redding	8.5	Bridgeport	25.5

Danbury-Waterbury.

	Miles		Miles
Danbury	0.0	Southbury	17.0
Newtown	9.2	Middlebury	25.9
Sandy Hook	10.7	Waterbury	31.6

Danbury-Norwalk.

	Miles		Miles
Danbury	0.0	Norwalk	22.1
Branchville	10.5		

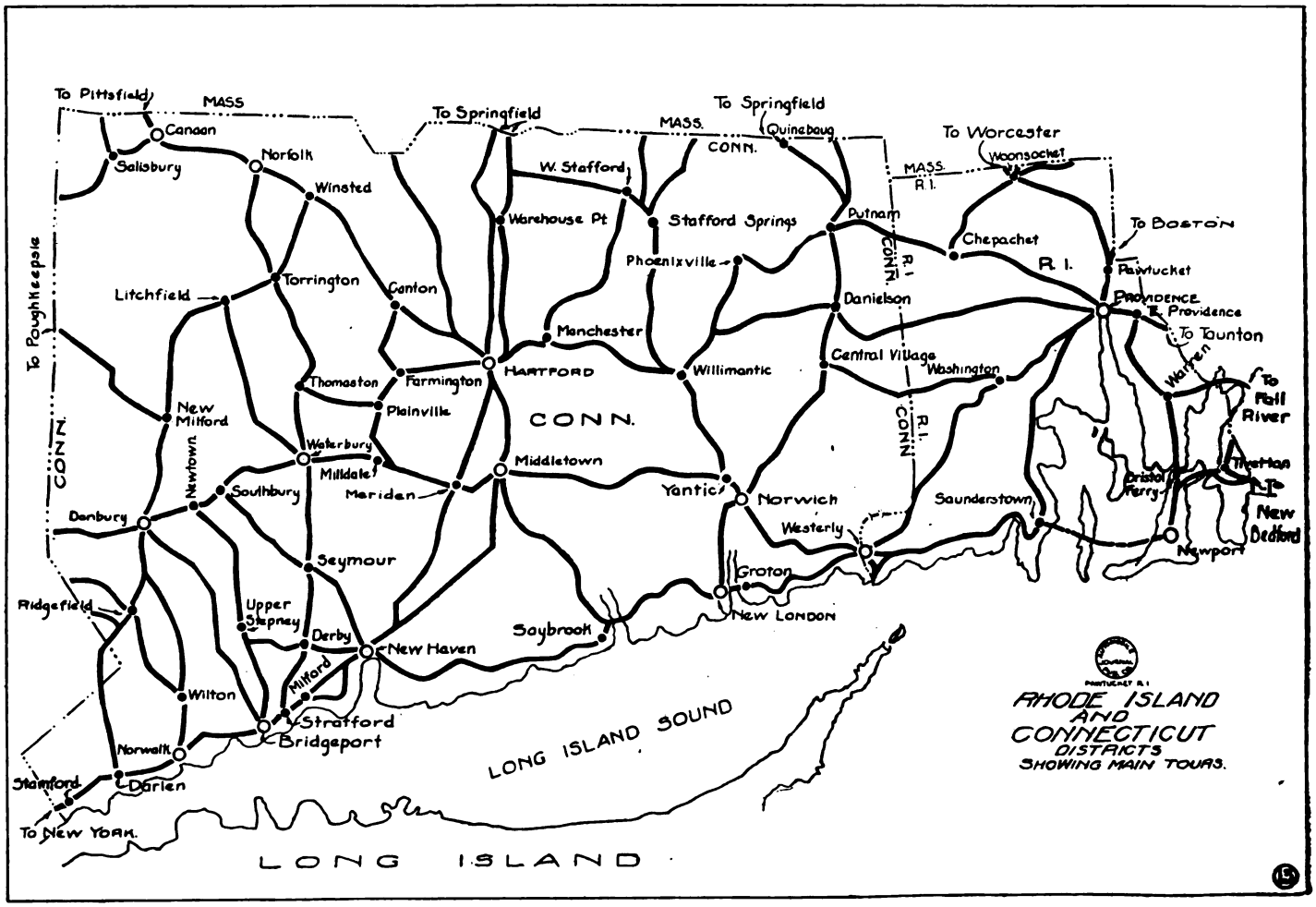
Danbury-Stamford.

	Miles		Miles
Danbury	0.0	Glenbrook	26.6
Lewisboro	13.8	Stamford	28.5
New Canaan	20.7		

Waterbury-Hartford.

	Miles		Miles
Waterbury	0.0	Plainville	16.7
Marion	6.7	Farmington	21.3
Milldale	8.1	Hartford	30.4
Southington	11.9		

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NEW YORK TO WHITE MOUNTAINS VIA GREENFIELD.

New York-Pittsfield.

	Miles		Miles
New York	0.0	Wassaic	90.0
Yonkers	14.0	Amenia	93 5
Dobbs Ferry	19.2	Millerton	102.5
Tarrytown	24.2	Lakeville	106.4
Briarcliff	30.9	Salisbury	107.9
Yorktown H'ths	41.6	S. Egremont	121.4
Carmel	57.4	Great Bar'gton	125.0
Patterson	65.8	Stockbridge	132.4
Pawling	70.5	Lenox	138.3
South Dover	78.3	Pittsfield	145.0

Pittsfield-Greenfield.

	Miles		Miles
Pittsfield	0.0	Goshen	30.5
Dalton	6.4	Williamsburg	36.3
Windsor	12.5	Haydenville	38.6
Cummington	24.2	Northampton	44.5
Lithia	28.6	Greenfield	64.5

Greenfield-White River Junction.

	Miles		Miles
Greenfield	0.0	Charlestown	51.5
Bernardston	6.0	Claremont	62.5
Guilford	17.6	W. Claremont	65.2
Brattleboro	20.5	Ascutneyville	67.4
Putney	30.0	Windsor	72.6
Westminster	38.6	Hartland	77.4
Bellows Falls	44.0	W. River June.	87.5

White River Junction-White Mountains.

	Miles		Miles
W. River Junc.	0.0	Woodsville	44.7
W. Lebanon	0.6	Bath	45.9
Hanover	4.5	Lisbon	51.6
Lyme	15.2	Littleton	62.3
Orford	22.3	Bethlehem	67.2
Piermont	28.3	White Mts.	
Haverhill	33.5	(Twin Mtn. H.	75.5

NEW YORK TO WHITE MOUNTAINS VIA BURLINGTON.

Pittsfield-Rutland.

	Miles		Miles
Pittsfield	0.0	Manchester	58.5
Lanesboro	5.3	Manchester C.	59.8
Williamstown	21.5	E. Dorset	65.1
Bennington	35.5	Danby	72.8
Shaftsbury	43.2	Wallingford	82.1
Arlington	50.4	Rutland	92.5

Pittsfield-Keene.

	Miles		Miles
Pittsfield	0.0	Stamford	28.5
Cheshire	10.7	Heartwell, V	34.1
Adams	15.8	Searsburg	40.2
North Adams	22.0	Keene	86.0

Pittsfield-Burlington.

	Miles		Miles
Pittsfield	0.0	Hampton	89.2
Manchester	58.5	Fair Haven	94.0
Man. Cen. P. O.	59.8	Castleton Cor.	97.0
Dorset	66.0	Hubbardton	104.1
E. Rupert	68.0	Sudbury	110.4
Pawlet	74.5	Cornwall	122.8
N. Pawlet	78.0	Middlebury	126.5
Wells	80.4	Burlington	161.5
Poultney	88.2		

Burlington-White Mountains.

	Miles		Miles
Burlington	0.0	W. Danville	65.3
Williston	7.8	Danville	68.2
Richmond	12.7	St. Johnsbury	75.5
Waterbury	26.5	Waterford	88.3
Montpelier	38.5	Littleton	93.8
E. Montpelier	45.5	Bethlehem	98.9
Plainfield	48.6	White Mts.	
Marshfield	55.1	(Twin M. H.)	107.0
E. Cabot	62.0		

OPTIONAL ROUTES.

Rutland-White River Junction.

	Miles		Miles
Rutland	0.0	Bridgewater	25.2
Mendon	4.2	Woodstock	31.7
Sherburne	13.4	Taftsville	35.0
W. Bridgewater	17.7	Quechee	38.6
Bridgew'r Crs.	23.7	W. R. Junction	45.0

Rutland-Lake George.

	Miles		Miles
Rutland	0.0	Comstock	33.4
W. Rutland	3.7	Fort Ann	37.4
Castleton	11.0	Hudson Falls	46.4
Castleton Crs.	12.6	Glenns Falls	50.0
Fair Haven	16.0	Lake George	59.0
White Hall	26.2		

BOSTON TO WHITE MOUNTAINS.

Boston-Concord.

	Miles		Miles
Boston	0.0	Nashua	43.5
Winchester	11.5	Reeds Ferry	53.0
Woburn	13.7	Manchester	62.0
Wilmington	18.9	Suncook	73.0
Tewksbury	24.7	Pembrook	74.6
Lowell	29.5	Concord	80.5
Tyngsboro	37.1		

Concord-White Mountains.

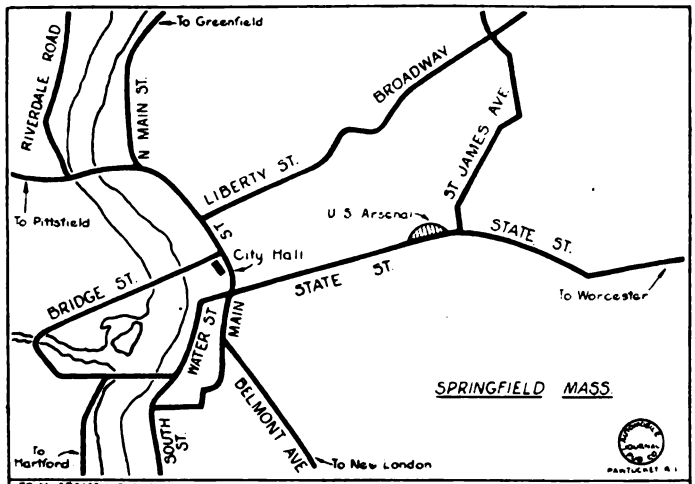
	Miles		Miles
Concord	0.0	Holderness	50.2
Penacook	6.1	Ashland	54.2
Boscawen	8.8	Plymouth	60.0
Franklin	18.5	Woodstock	77.0
Tilton	22.0	N. Woodstock	81.0
Winnisquam	28.5	Flue House	86.0
Laconia	31.3	Profile House	91.0
Lakeport	33.0	White Mts.	
Wiers	37.5	(Twin M. H.)	104.5
Meredith	42.4		

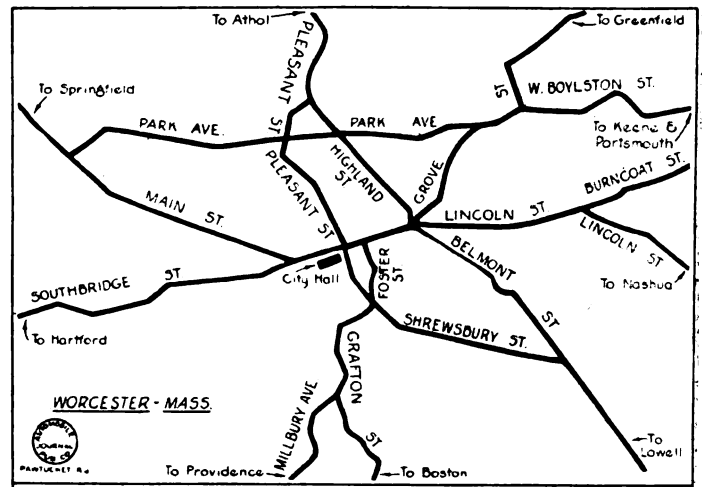
Boston-Portsmouth.

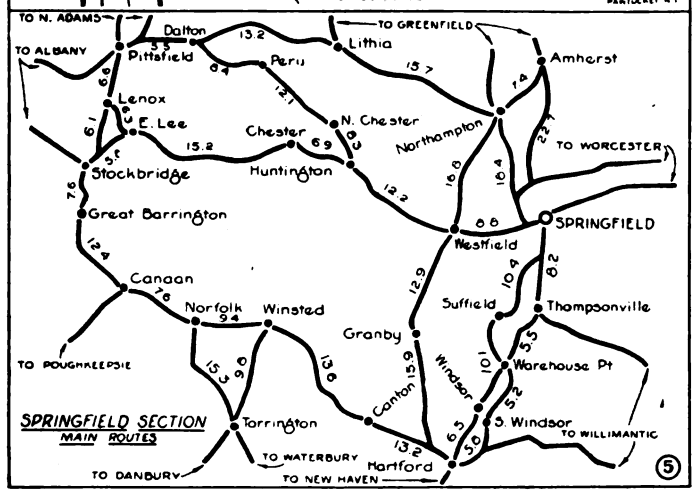
	Miles		Miles
Boston	0.0	Rawley	38.2
Revere Beach	11.1	Newbury	42.5
Lynn	15.0	Newburyport	46.0
Salem	21.5	Salisbury	48.6
Beverly	23.1	Smithtown	51.3
Wenham	28.0	Hampton Falls	54.2
Hamilton	30.0	Rye Beach	63.2
Ipswich	34.3	Portsmouth	73.5

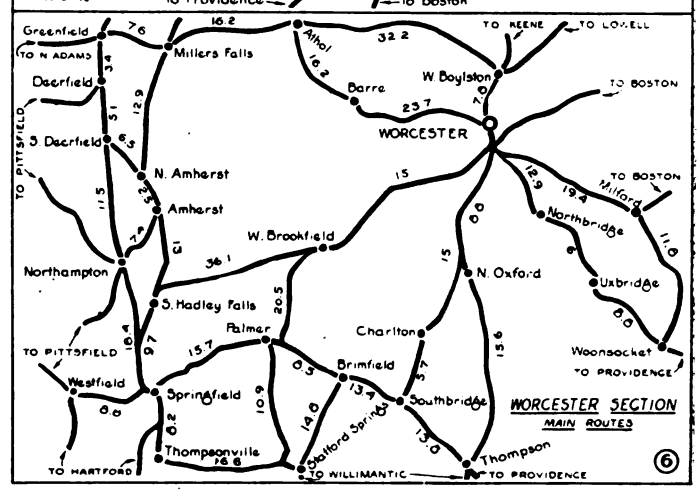
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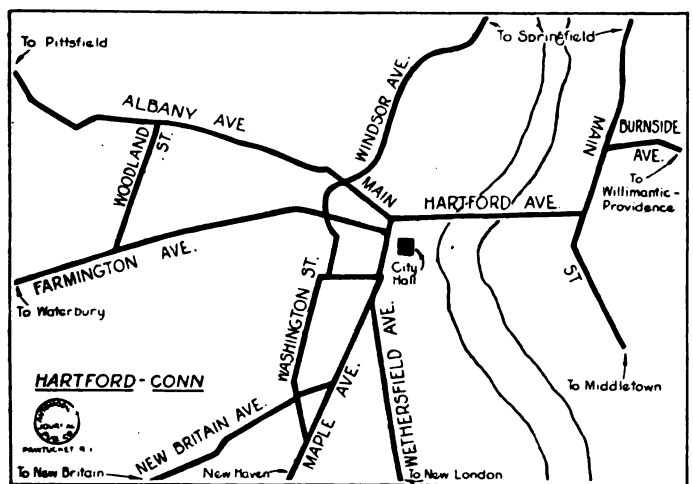
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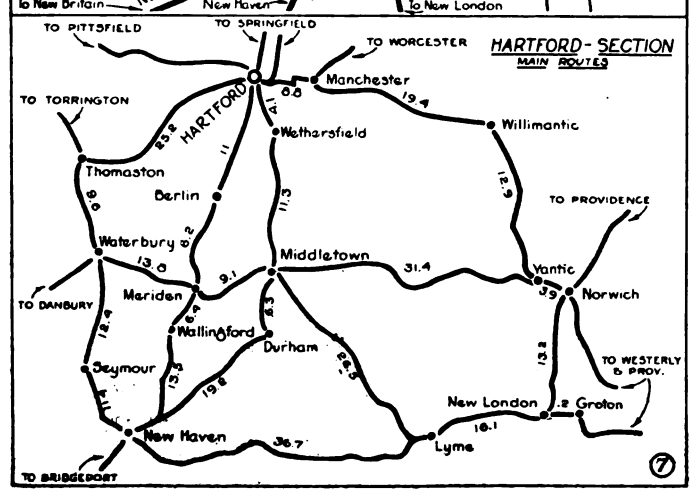


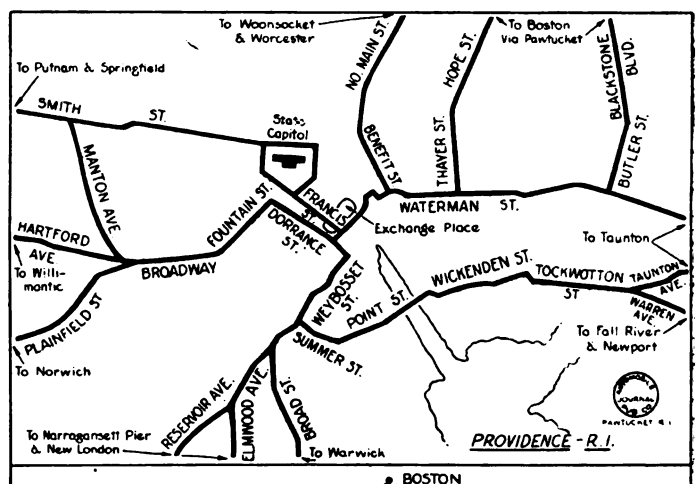


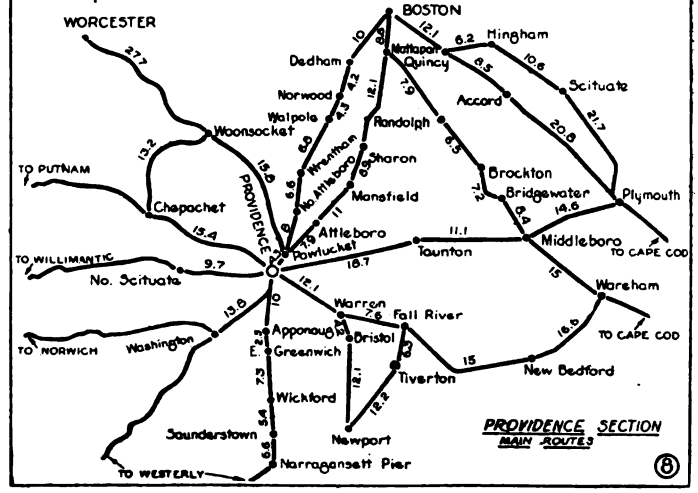




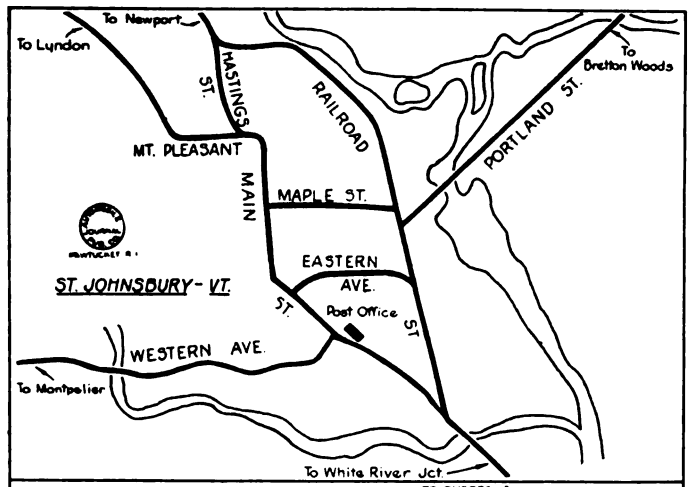


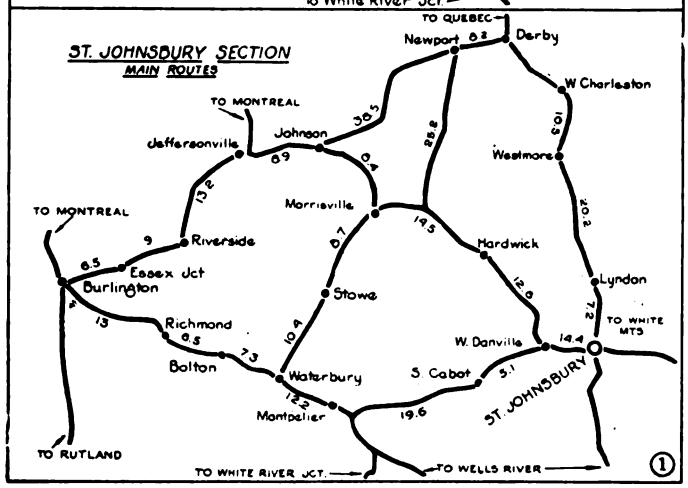


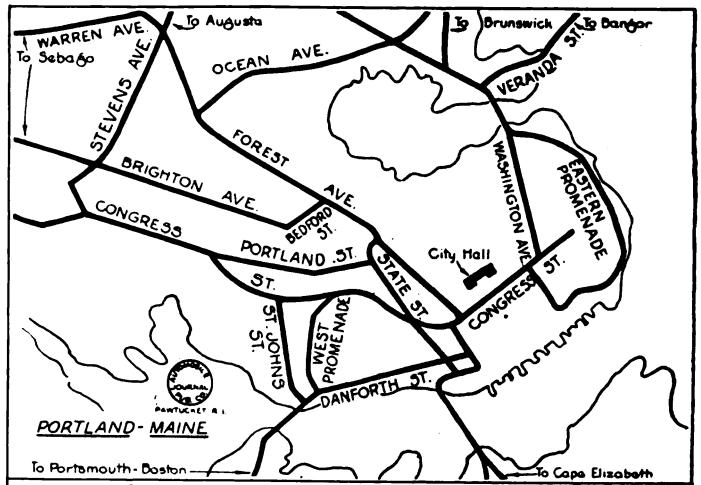


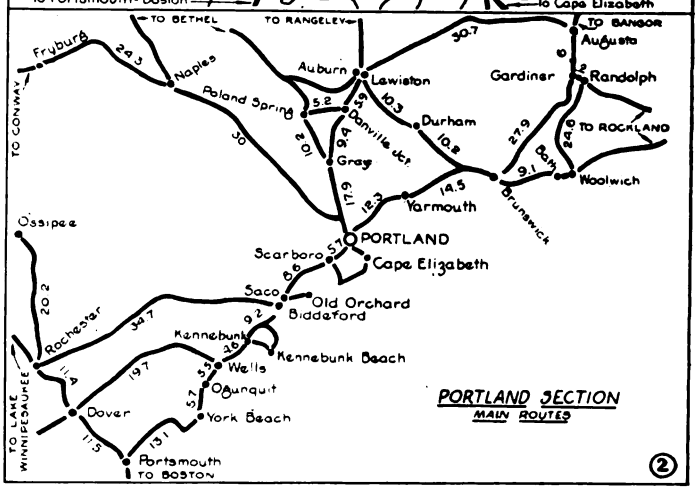


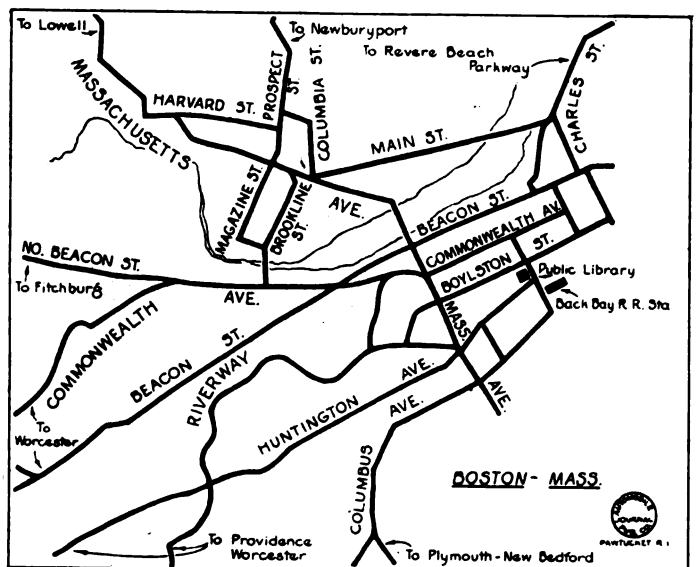
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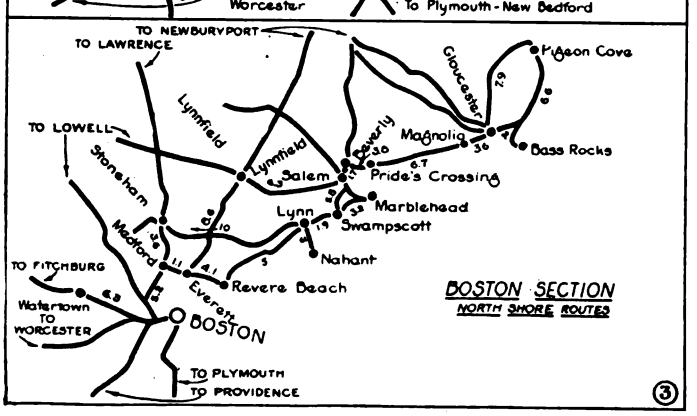


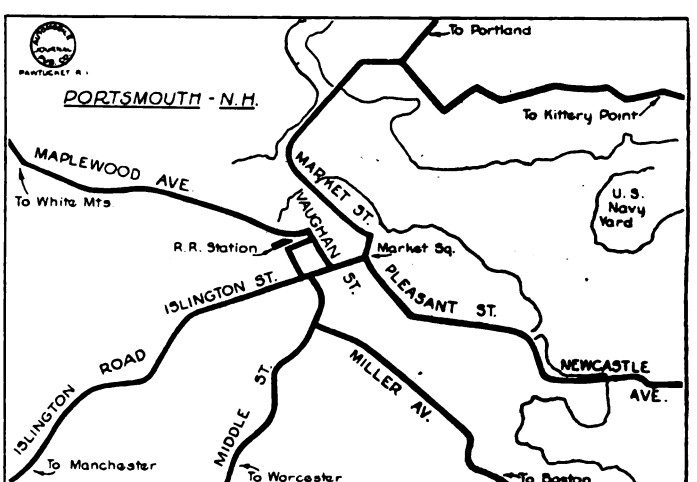


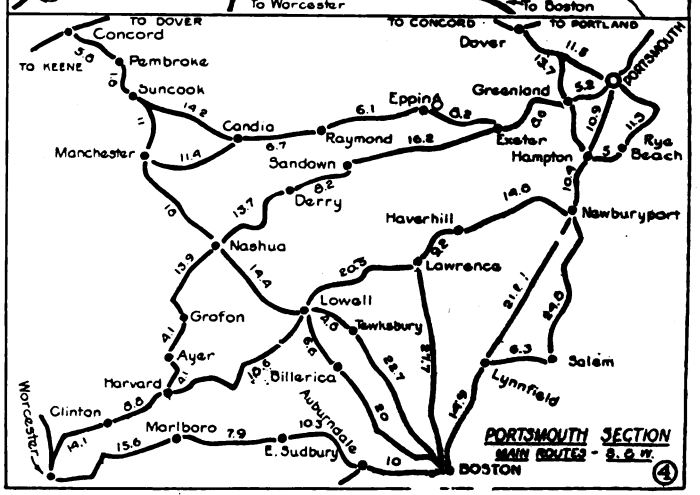












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(Continued from Page 28.)

Portsmouth-White Mountains.

	Miles		Miles
Portsmouth	0.0	Conway	80.5
Dover	11.5	N. Conway	86.0
Summersworth	16.3	Intervale	87.8
Rochester	23.0	Glen	91.8
Milton	31.0	Bartlett	96.0
Union	37.0	Bemis	104.0
Sanbornville	42.0	Crawf'd House	112.6
Wakefield	43.0	Bretton Woods	115.9
Ossipee	53.0	Fabyans	116.5
W. Ossipee	64.5	White Mts.	
Chocorua	68.5	(Twin M. H.)	121.0

PORTSMOUTH TO WHITE MOUNTAINS VIA POLAND SPRINGS.

Portsmouth-Portland.

	Miles		Miles
Portsmouth	0.0	Ogunquit	19.0
Kittery	1.1	Wells	24.5
York Cor	7.6	Kennebunk	29.0
York	8.5	Biddeford	38.5
York Harbor	9.5	Saco	39.5
York Beach	13.2	Dunstan	45.1
Cape Neddick	15.0	Portland	54.0

Portland-Poland Springs and White Mountains.

	Miles		Miles
Portland	0.0	Redstone	78.3
Gray	17.0	N. Conway	81.5
Dry Mills	19.6	Intervale	83.4
Poland Springs	27.5	Glen	87.3
Poland	30.5	Bartlett	93.5
Webbs Mills	39.1	Bemis	99.5
Cooks Mills	43.0	Crawf'd House	108.1
Naples	46.7	Bretton Woods	111.4
Bridgton	55.1	Fabyans	112.0
E. Fryeburg	64.9	White Mts.	
Fryeburg	70.9	(Twin M. H.)	116.5
Conway	75.6		

PORTLAND TO FT. KENT VIA BANGOR.

Portland-Rockland.

	Miles		Miles
Portland	0.0	Newcastle	54.1
Yarmouth	11.9	Damariscotta	54.5
Freeport	11.7	Waldoboro	64.3
Brunswick	26.5	West Warren	71.3
Woolwich	35.7	Thomaston	76.7
Wiscasset	45.0	Rockland	81.0
N. Edgecomb	46.7		

Rockland-Bangor.

	Miles		Miles
Rockland	0.0	Stockton	37.2
Rockport	6.4	Prospect	41.7
Camden	8.0	Frankfort	45.7
Northport	19.0	Hampden	55.8
Belfast	27.0	Bangor	62.0
Searsport	33.0		

Bangor-Houlton.

	Miles		Miles
Bangor	0.0	Lincoln	49.0
Orono	8.0	Matawamkeag	63.0
Oldtown	13.0	Macwahoc	72.5
Passadumkeag	32.0	Haynesville	92.5
West Enfield	37.0	Houlton	117.0

Houlton-Fort Kent.

	Miles		Miles
Houlton	0.0	North Lenton	60.5
Middleton	7.3	Van Buren	76.2
Monticello	12.8	Grand Isle	91 7
Blaine	26.5	Madawaska	100.5
Presque Isle	41.5	Fort Kent	120.5
Carribou	54.2		

OPTIONAL TRIPS.

Bangor-Skowhegan.

	Miles		Miles
Bangor	0.0	Newport	26.2
Hermon	7.5	Pakmyra	30.6
Carmel	14.7	Canaan	42.5
Etna	18.0	Skowhegan	51.0

Skowhegan-Rangeley.

	Miles		Miles
Skowhegan	0.0	Dead River	43.0
Lakewood	5.7	Flagstaff	52.1
North Anson	12.5	Stratton	63.1
N. New Portl'd	21.1	Rangeley	83.0
Lexington	29.5		

Bar Harbor-Portland.

	Miles		Miles
Bar Harbor	0.0	Orland	37.0
Ellsworth	19.8	Bucksport	39.7
East Orland	33.3	Prospect	40.6
(Via Bangor Route)			
Portland	166.0		

Portland-Augusta.

	Miles		Miles
Portland	0.0	Lewiston	33.6
Gray	17.0	Greene	42.0
Up. Gloucester	24.5	Winthrop	54.5
Danville June	27.7	Manchester	60.6
Auburn	33.4	Augusta	65.0

PORTLAND TO RANGELEY VIA AUGUSTA.

Portland-Rangeley.

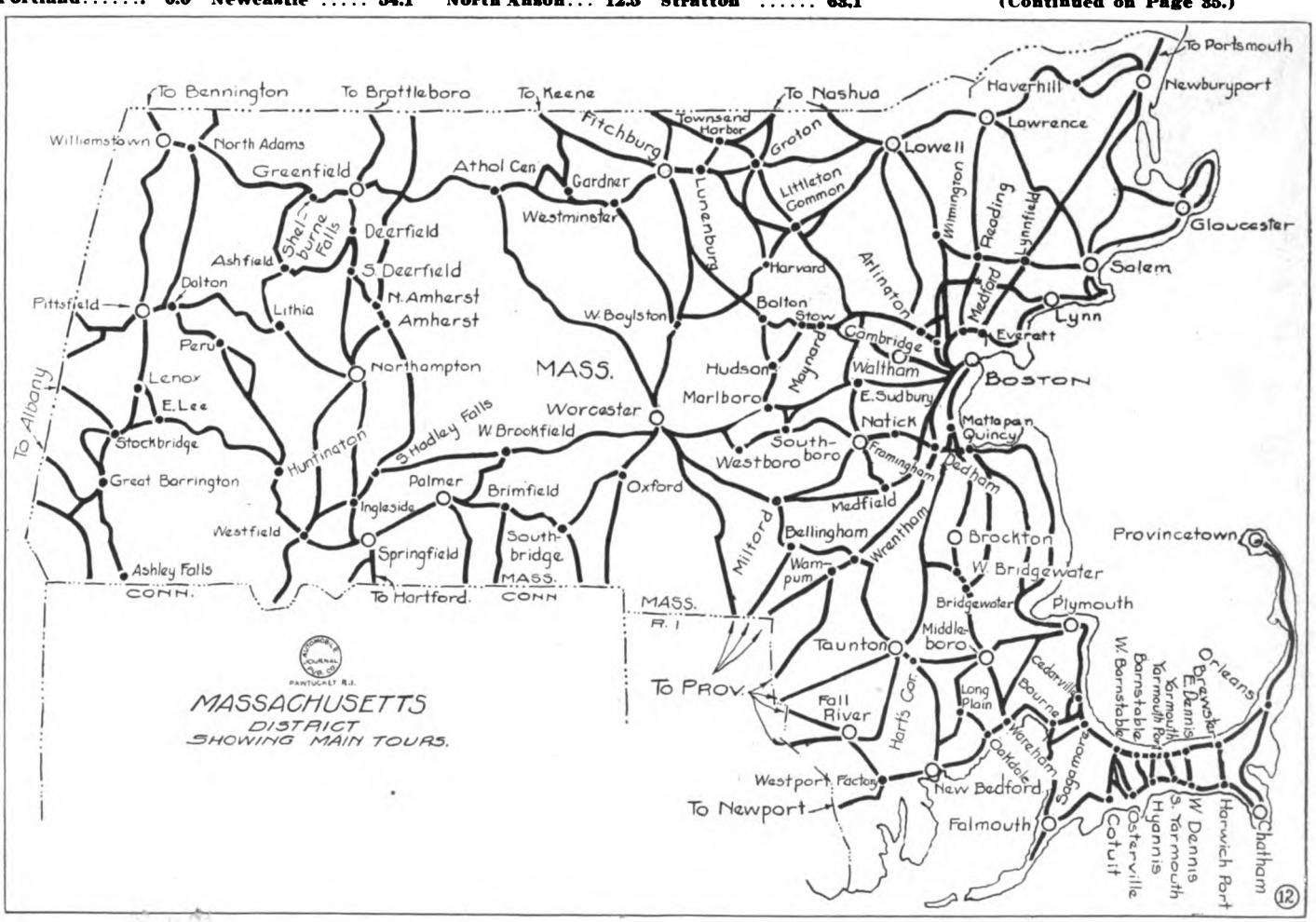
	Miles		Miles
Portland	0.0	Howes Corner	50.1
Gray	17.0	Norlands	55.1
Up. Gloucester	24.5	Livermore Falls	60.2
Danville June	27.7	North Jay	66.6
Auburn	33.4	Wilton	69.7
E. Auburn	36.5	Farmington	77.2
(Via Augusta Route)			
Rangeley	119.0		

MOOSEHEAD ROUTE VIA AUGUSTA.

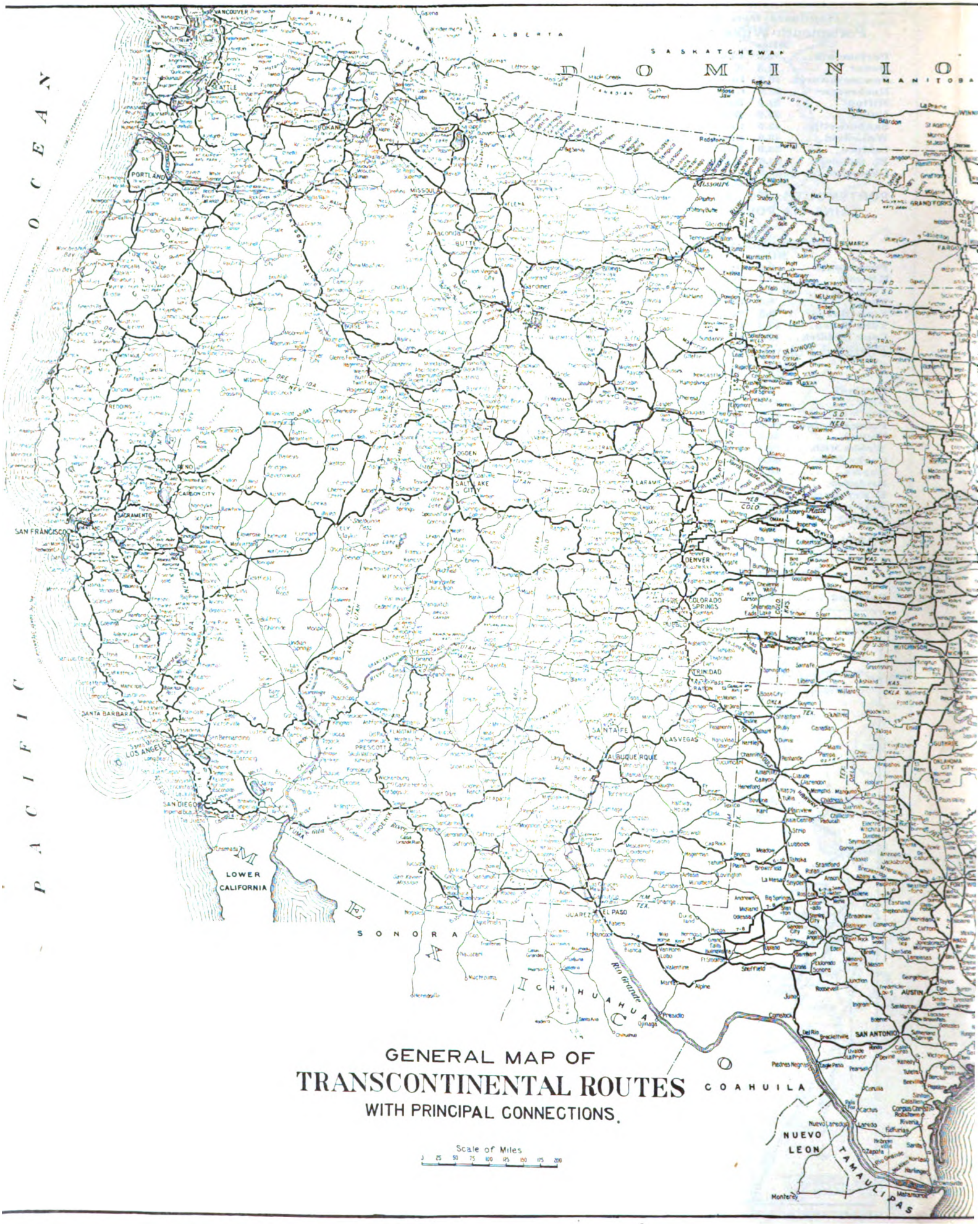
Augusta-Moosehead.

	Miles		Miles
Augusta	0.0	Athens	49.0
Vassalboro	11.7	Brighton	57.5
Waterville	19.5	Kingsbury	63.4
Fairfield Centre	23.0	Greenville	90.8
Skowhegan	36.0	Greenville June.	92.5
North Cornville	47.0		
(Bonts to Moosehead.)			

(Continued on Page 35.)



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GENERAL MAP OF
TRANSCONTINENTAL ROUTES
WITH PRINCIPAL CONNECTIONS.

Scale of Miles
0 25 50 75 100 125 150 175 200

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(Continued from Page 31.)

CAPE TRIPS FROM BOSTON.

Boston-Falmouth.

	Miles		Miles
Boston	0.0	Tremont	48.8
Randolph	15.8	Wareham	52.0
Avon	18.2	Onset	56.3
Brockton	22.0	Bourne	60.5
W. Bridgewater	26.5	Monument B'ch	62.4
Bridgewater	29 3	West Falmouth	71.5
Middleboro	37.5	Falmouth	75.5

Falmouth-Chatham.

	Miles		Miles
Falmouth	0.0	Centreville	21.2
Waquoit	6.6	Hyannis	25.1
Mashpee	11.7	S. Yarmouth	30.6
Santuit	13.6	S. Harwich	38.3
Marston Mills	15.7	Chatham	43 5
Osterville	18.3		

Chatham-Provincetown.

	Miles		Miles
Chatham	0.0	Wellfleet	22.0
Orleans	9.5	Truro	26.7
Eastham	13.0	Provincetown	36.5

Provincetown-Providence.

	Miles		Miles
Provincetown	0.0	Onset	69.6
Truro	9.7	Wareham	74.0
Wellfleet	14.5	Marion	79.2
Eastham	23.4	Mattapoisett	84.0
Orleans	27.0	Fairhaven	90.0
Brewster	32.6	New Bedford	91.0
Dennis	39.2	Westport Fact'y	97.5
Yarmouth	42.5	Fall River	102.5
Barnstable	46.5	Swansea	109.1
Sandwich	58.8	Seekonk	119.4
W. Sagamore	61.0	Providence	124.0

Boston-Plymouth.

	Miles		Miles
Boston	0.0	Greenbush	29.6
Forest Hills	5.7	Marshfield Cen.	35.3
Quincy	13.0	Marshfield	37.7
Hingham	17.3	Kingston	45.9
Cohasset	23.9	Plymouth	50.5
North Scituate	26.0		

Boston-Newport, R. I.

	Miles		Miles
Boston	0.0	Dighton	41.8
Forest Hills	5.7	Somerset	45.1
Punkapoag	14.0	Fall River	50.8
Stoughton	19.1	Tiverton	57.3
Taunton	26.4	Newport	69.5

Providence-Newport, R. I.

	Miles		Miles
Providence	0.0	Bristol Ferry	16.7
Warren	12.2	Newport	28.5
Bristol	16 0		

MOHAWK TRAIL FROM BOSTON.

Boston-Greenfield.

	Miles		Miles
Boston	0.0	Westminster	54.3
Cambridge	0.8	Gardner	58.8
Lexington	11.4	Otter River	63.4
Concord	11.5	Baldwinville	64.6
North Acton	25.0	Athol	74.7
Littleton	27.8	Orange	79.3
Littleton Center	28.6	Erving	84.3
Ayer	34.7	Millers Falls	90.6
Lunenburg	43.0	Turners Falls	94.8
Fitchburg	47.0	Greenfield	98.0

Greenfield-Albany.

	Miles		Miles
Greenfield	0 0	N. Bownal	49.8
Shelburne	5.4	N. Petersburg	53.5
Shelburne Falls	9.0	Petersburg	59.0
Charlemont	17.5	Brunswick Cor.	74.7
North Adams	36.5	Troy	79.5
Williamstown	41 5	Albany	85.0
Bownal	46.9		

ROUTES TO CANADA.

Burlington-Montreal.

	Miles		Miles
Burlington	0.0	Rouses Point	48.5
Winooski	2.1	Lacolle	56.8
Colchester	6.2	Napierville	64.8
South Hero	18.1	Douglas Corner	67.1
Grand Isle	24.5	St. Jacques	72.8
North Hero	31.1	Laprairie	85.1
Alburg Passage	36.7	Montreal	94.0
Alburg	45.1		

Burlington-Newport, Vt.

	Miles		Miles
Burlington	0.0	Johnson	38.0
Winooski	2.1	N. Hyde Park	43.5
Essex Junction	6.5	Eden	47.6
Essex	9.6	Lowell	57.7
Jerico	12.9	Westfield	64.3
Underhill	16.2	Troy	66.3
Cambridge	26.4	Newport	77.0
Jeffersonville	29.0		

Newport-Quebec, P. Q.

	Miles		Miles
Newport	0.0	D'Israeli	95.5
West Derby	0.9	Colraine	100.9
Derby Line	8.2	Black Lake	106.9
Rock Island	8.5	Thetford Mines	111.7
Stanstead	9.8	Robertson	117.3
Massawippi	22 2	Broughton	123.3
Waterville	32.1	Young Junct'n	133.2
Lenoxville	39.3	St. Joseph	141.1
Sand Hill	45.7	Beauce Junct'n	146.3
Birchton	49.4	St. Marie	152.8
Cookshire	52.4	Scott	158.0
Angus	58.4	St. Maxime	158.6
Marbleton	70.6	St. Henri	172.5
Wedon	79.7	St. Louis	177.6
Wedon Lake	83.9	Levis	183.0
Garthby	90.3	Quebec	183.5

Burlington-Richford.

	Miles		Miles
Burlington	0.0	Enosburg Falls	51.0
Milton	19.6	Sampsonville	55.0
Georgia	26.2	East Berkshire	56.2
St. Albans	32.1	Richford	60.8
Sheldon Springs	41.8		

Richford, Vt.-Quebec.

	Miles		Miles
Richford	0.0	Danville	72.0
Abercorn	3.0	Warwick	83.7
Sutton Flat	9.0	Arthabaska	92.0
Sutton Junction	12.0	Stanfold	105.0
Brome	16.0	Plessisville	110.7
Knowlton	20.0	St. Julie	120.0
Waterloo	30.0	St. Agathe	136.0
Warden	37.0	St. Guiles	145.0
Lawrenceville	41.0	Craig's Rd. Sta.	154.0
Racine	48.0	St. Romauld	170 0
Melbourne	60.0	Levis	176.0
Richmond	61.0	Quebec	176.5



A Vista Through the Woods in the Valley of Deerfield River. A Scene from the Highway in Western Massachusetts.

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THE ADIRONDACK TRAIL

THE Adirondack Trail winds up through the rolling hills of the Berkshires and into the rugged mountains of the Adirondacks, reaching almost to the Canadian line before turning southwest to Rochester. Then swinging down across New York state the route continues eastward along the southern tier, finally striking the Hudson river again at Nyack and returning to New York City.

With New York City as the starting point, the tourist proceeds through the city and follows the Hudson river, through Yonkers, Hastings, Dobbs Ferry and Irvington, leaving the river at Scarboro. The route then turns inland and passes through Briarcliff, crosses the Pines Bridge and continues on through Yorktown Heights to Lake Mahopac, which is a charming spot in the foothills of the Berkshires.

The train then runs practically north through Amenia and Millerton before crossing a corner of Connecticut and entering Massachusetts. Great Barrington, Stockbridge and Lenox are especially attractive places, being among the most beautiful sections of the Berkshires.

The route turns at Pittsfield in an easterly direction and crosses the state line into New York and thence to Albany, where the trail turns north through Newtonville and other small towns. Saratoga Springs is the next place of importance. This is the county seat of Saratoga county, and is one of the most popular resorts in New York state. Saratoga Springs is now a state reservation. The medicinal properties of its waters have added to its fame. There are state bath houses and beautiful parks there.

At Foot of Adirondacks.

Leaving Saratoga Springs, the tourist proceeds north to Glens Falls, which is at the foot of the Adirondacks. The route then turns past Lake George to Chestertown. Through this section the country is mountainous and beautiful. The motorist need have nothing to fear, as the roads are of good macadam.

Passing Schroon Lake the motorist goes almost directly north to Keene and then west to Lake Placid. The next part of the tour is west on a winding but delightfully smooth road into the village of Saranac Lake.

The course now proceeds northerly again, through a very wild part of the Adirondacks.

New York-Pittsfield.

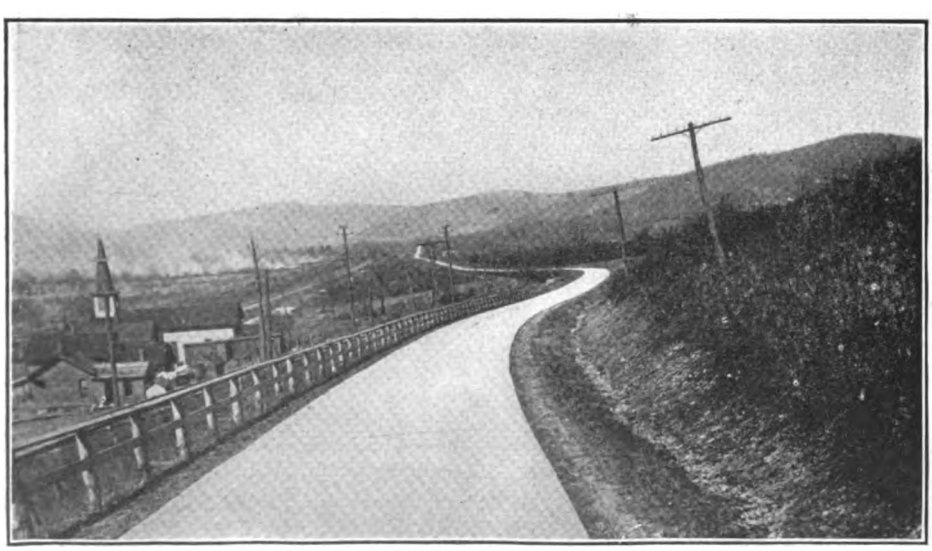
	Miles		Miles
N. Y. (Madison ave. & 43d st.)	0.0	Carmel	58.6
Yonkers	14.4	Patterson	68.2
Hast.-on-Hud.	17.9	Pawling	71.8
Dobbs Ferry	18.9	S. Dover	79 6
Irvington	21.4	Dover Plains	85.8
Tarrytown	24.1	Wassaic	91.4
Scarboro	28.3	Amenia	94.8
(Onondaga Trail starts here.)		Millerton	103.6
Briarcliff	31.9	Lakeville, Ct.	106.9
Kitchawan	38.0	Salisbury	108.6
Croton Lake St.	38.3	S. Egremont P. O., Mass.	121 6
Yorktown Hts.	42.7	G. Barrington	125.6
Amawalk Sta.	44.4	Stockbridge	133.0
Baldw'n P. P. O.	49.4	Lenox	139.8
Lake Mahopac	53.0	Pittsfield	146.4

Pittsfield, Mass.-Saratoga Springs.

	Miles		Miles
Pittsfield	0.0	Loudenville	40.7
Shaker Village.	4.5	Newtonville	42.0
New Lebanon	10.8	Lathams cors.	43.8
N. Leb. Center.	12.2	Cohoes	48.2
West Lebanon.	14.9	Waterford	50.1
Nassau	23.5	Mechanicsville.	58.9
E. Greenbush	30.8	Maltaville	64.8
Rensselear	35.2	Malta	67.0
Albany	36.0	Saratoga Spgs.	75.1

Saratoga-Schroon Lake.

	Miles		Miles
Saratoga	0.0	Warrensburg	34.2
Wilton	7.4	Chestertown	46.2
S. Glen Falls	17.8	Pottersville	55.0
Glen Falls	18.7	Taylors-on-Schroon	58.7
French Mount.	24.0	Schroon Lake	54.3
Lake George	28.1		



A Road in New York State.

Schroon Lake-Lake Placid.

	Miles		Miles
Schroon Lake	0.0	Jay	53.3
Schroon River.	9.3	Wilmington	58.0
Euba Mills	21.4	Wilm'ton Notch	58.4
Elizabethtown.	31.5	Newman	70.8
Keene	43 6	Lake Placid	71.4
Upper Jay	49.7		

Lake Placid-Malone.

	Miles		Miles
Lake Placid	0.0	McColloms	28.4
Saranac Lake	9.5	Duane Center	40.3
Gabriel Sta	18.3	Whippleville	54.2
Brighton	20.7	Malone	57.6
Paul Smith's	21.8		

Malone-Watertown.

	Miles		Miles
Malone	0.0	De Kalb Jct	60.4
N. Bangor	5.3	Old De Kalb	64.4
Brushton	10.9	Richville	72.0
Moira	13.1	Gouverneur	78.5
Lawrenceville.	18.6	Somerville	86.1
Nicholville	24.9	Antwerp	90.8
Hopkinton	27.2	Theresa	102.3
Potsdam	41.5	Pamelia	112.3
Waterloo	43.5	Watertown	120.9
Eddy	57.3		

Watertown-Oswego.

	Miles		Miles
Watertown	0.0	Pulaski	31.7
Adams Center.	10.0	Maple View	39.4
Adams	13.6	Mexico	43.7
Pierrepont Man.	19.4	New Haven	48.4
Mannsville	21.0	Scriba	54 4
Sandy Creek	26.0	Oswego	58.8

Oswego-Rochester.

	Miles		Miles
Oswego	0.0	Williamson	48.1
Sterling Center	12.7	Ontario	53.1
Red Creek	21.2	Ontario Center.	54.4
Wolcott	27.0	Fruitland P. O.	56.9
Alton	36.8	Union Hill	57.9
Wallington Sta.	38.6	Webster	60.8
Sodus	41.3	W. Webster	64.1
E. Williamson	45.6	Rochester	72.1

Rochester-Watkins.

	Miles		Miles
Rochester	0.0	Stanley	42.0
Pittsford	7.6	Halls Corners	45.6
Mendon	14.1	Benton Center.	50.6
Victor	19.4	Penn Yan	54.6
Canandaigua	29.8	Dundee	66.6
Hopewell	37.3	Reading Center	74.6
Flint	39.3	Watkins	79.7

Watkins-Elmira.

	Miles		Miles
Watkins	0.0	Horseheads	16.4
Montour Falls.	2.9	Elmira Hts. Sta.	19.1
Millport	9.3	Elmira	22.2
Pine Valley	12.0		

Elmira-Binghamton.

	Miles		Miles
Elmira	0.0	Owego	38.2
Lowman	6.5	Apalachin	43.3
Chemung	12.4	Vestal	49.5
Waverly	17.1	Union	50.2
Fork	17.9	Endicott	52.4
Barton	23.8	Johnson City	56.0
Smithboro	26.5	Binghamton	58.6
Tioga Center	30.5		

Binghamton-Liberty.

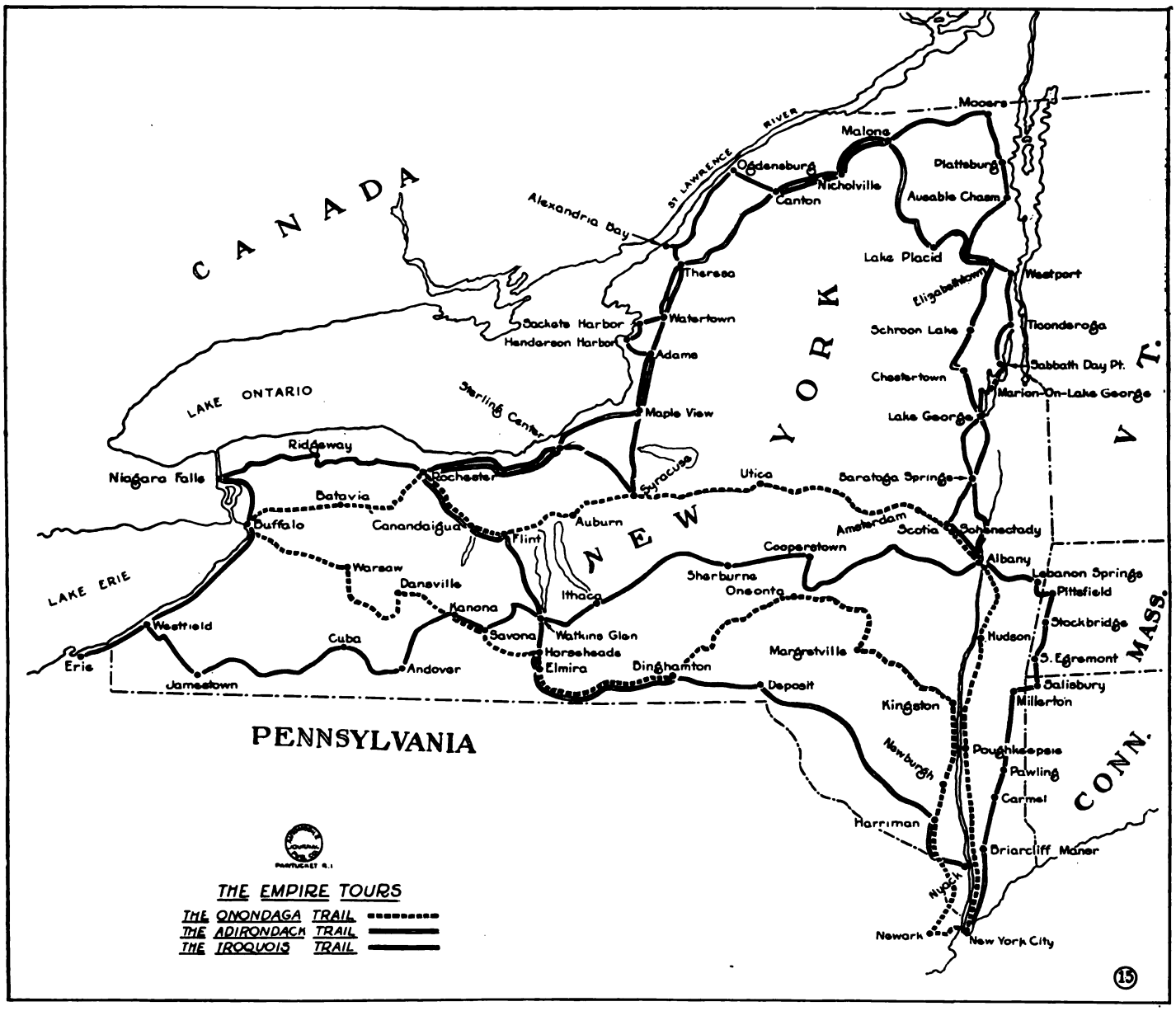
	Miles		Miles
Binghamton	0.0	Horton	63.5
Windsor	15.6	Cook's Falls	66.2
Damascus	17.9	Roscoe	72.0
Deposit	31.0	Livingston Man.	78.8
Hale Eddy	35.9	Parksville Sta.	84.2
Hancock	44.3	Liberty	88.2

Liberty-Goshen.

	Miles		Miles
Liberty	0.0	Bloomingburg.	28.5
Monticello	12.1	Middletown	36.7
Wurtsboro	24.1	Goshen	45.1
High View	27.3		

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NEW YORK STATE SHOWING EMPIRE TOURS



The Empire Tours Are Crowded with Interest. The Above Map Shows the Onondaga, Adirondack and Iroquois Trails. Good Roads Go to Make Up These Tours, and the Scenery Is Splendid Throughout.

Goshen-New York.

	Miles		Miles
Goshen	0.0	Nanuet	35.9
Chester	4.3	Nyack	41.0
Monroe	9.2	Tarrytown	41.8
Harriman	11.5	Irvington	44.5
Southfields	16.7	Dobbs Ferry	46.0
Tuxedo	20.8	Hastings	47.8
Sloatsburg	23.5	Yonkers	52.0
Suffern	27.6	43d and Madison ave., N. Y. C.	65.6
Monsey	32.2		
Spring Valley	33.4		

NIAGARA FALLS TOUR.

New York-Poughkeepsie.

	Miles		Miles
New York	0.0	Harmon	32.7
Yonkers	14.4	Croton	33.8
Hast.-on-Hud.	17.9	Peekskill	41.5
Dobbs Ferry	18.9	Fishkill Village	60.9
Irvington	21.4	Wap'gers Falls	66.0
Tarrytown	24.1	Poughkeepsie	73.7
Ossing	30.0		

Poughkeepsie-Albany.

	Miles		Miles
Poughkeepsie	0.0	Blue Stores	30.8
Hyde Park	6.2	Livingston	34.0
Staatsburg	10.2	Hudson	42.3
Rhinebeck	16.3	Stockport	48.2
Red Hook	21.7	Stuyv'sant Falls	51.7
Up. Red Hook	24.4	Kinderhook	54.9
Nevis	27.0	Valatie	56.0
Clermont	28.9	E. Greenbush	54.9
(Adirondack Trail Starts Here.)			
Rensselear	74.4	Albany	75.3

Albany-Utica.

	Miles		Miles
Albany	0.0	Nelliston	56.0
Schenectady	14.9	St. Johnsville	61.9
Scotia	16.5	Little Falls	72.2
Amsterdam	30.8	Herkimer	79.3
Fort Johnson	33.7	Mohawk	80.9
Tribes Hill	36.1	Ilion	82.5
Fonda	41.5	Frankfort	85.0
Palatine Bridge	53.1	Utica	94.6

Utica-Syracuse.

	Miles		Miles
Utica	0.0	Chittenango	34.0
New Hartford	3.0	Mycenae	37.3
Vernon	16.5	Manlius Center	41.3
Oneida Castle	21.7	East Syracuse	45.1
Wampsville	24.9	Syracuse	45.9
Canastota	27.3		

Syracuse-Rochester.

	Miles		Miles
Syracuse	0.0	Flint	57.9
Camillus	8.3	Hopewell	60.0
Elbridge	15.3	Canandaigua	67.4
Sennett	20.4	Victor	77.6
Auburn	25.4	Mendon	83.0
Seneca Falls	40.1	Pittsford	89.6
Waterloo	43.5	Rochester	97.2
Geneva	51.0		

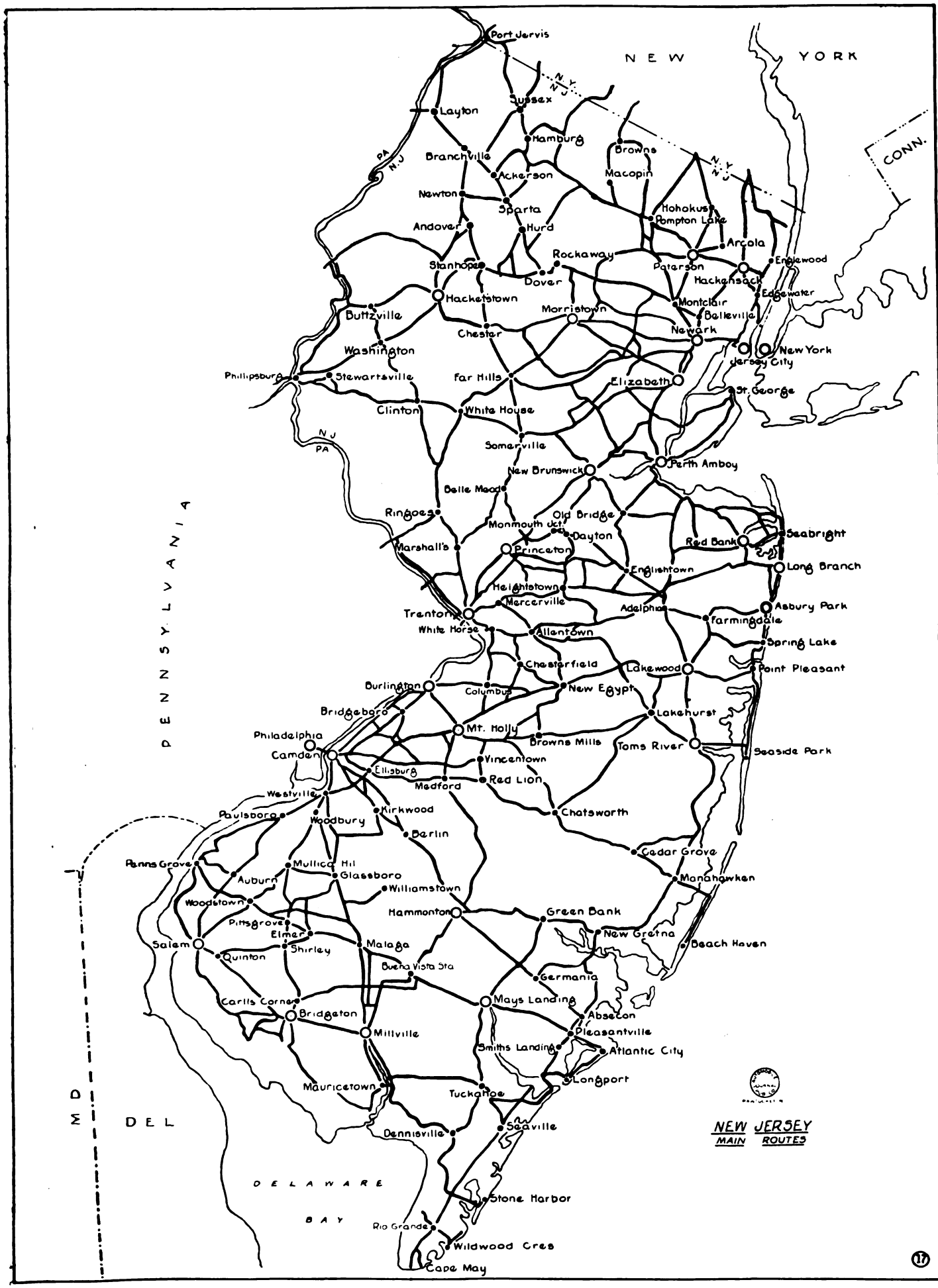
Rochester-Buffalo.

	Miles		Miles
Rochester	0.0	Batavia	37.3
Scottsville	12.4	East Pembroke	43.4
Garbutt	14.7	Pembroke	50.3
Mumford	18.9	Clarence	58.3
Caledonia	20.2	Williamsville	66.2
LeRoy	27.3	Snyder	68.2
Stafford	31.4	Buffalo	75.9

Buffalo-Niagara.

	Miles		Miles
Buffalo	0.0	St. Johnsburg	16.2
		Niagara Falls	26.4

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WILL TOUR NORTHWEST WITH TRUCK TRAIN FOR SIXTY DAYS

A practical demonstration that will prove power truck efficiency is the object of the National Motor Truck Development Tour, directed by the National Association of Motor Truck Sales Managers, which will start from Chicago, Aug. 4, and will end at Milwaukee, Wis., Oct. 4.

This tour will be the first of the kind ever organized and it is expected to be the first of a series which will be conducted in different sections of the country.

The plan has at least the merit of originality and the object is to take into each town and city through which the route shall pass an attraction which will be of decided interest to every citizen.

The number of machines that will make up the caravan is not as yet determined, but as many as 25 and possibly more will start. The plan is to have one truck of each make only in line, and the manufacturer can elect any size machine between the load ratings of one and 2½ tons.

All of the trucks will be equipped with pneumatic tires, which will be another novelty. The tour will be the longest drive of the kind ever undertaken and the total distance to be covered between the start and the finish is in road mileage 2778 miles.

Route Itinerary 2778 Miles.

But there is probability that the trucks will be driven considerably more than the distance established in the itinerary, and probably 3500 miles would be a fair estimate of the total before the trucks return to Chicago, for the finish will be 85 miles from the start. Then there is the distance that must be driven to mobilize the caravan, which will depend largely upon the location of the manufacturer.

The average distance to be driven a day will closely approximate 50 miles. There will be no attempt to make speed because the desire is to demonstrate the uses that may be made of trucks by farmers, and loads will be carried between points that will be determined from time to time and will depend very largely upon the propositions that will be made by the men in charge.

Special Bodies to Be a Feature.

Each manufacturer is expected to have the truck entered equipped with a type of body that will have the greatest utility to the farmer owner, and the sales manager is at liberty to make any choice of body. There is reason to expect that the majority of the bodies will be convertible types that can be adapted for widely varying work, which will be practical in manner of conversion, and be reasonably priced.

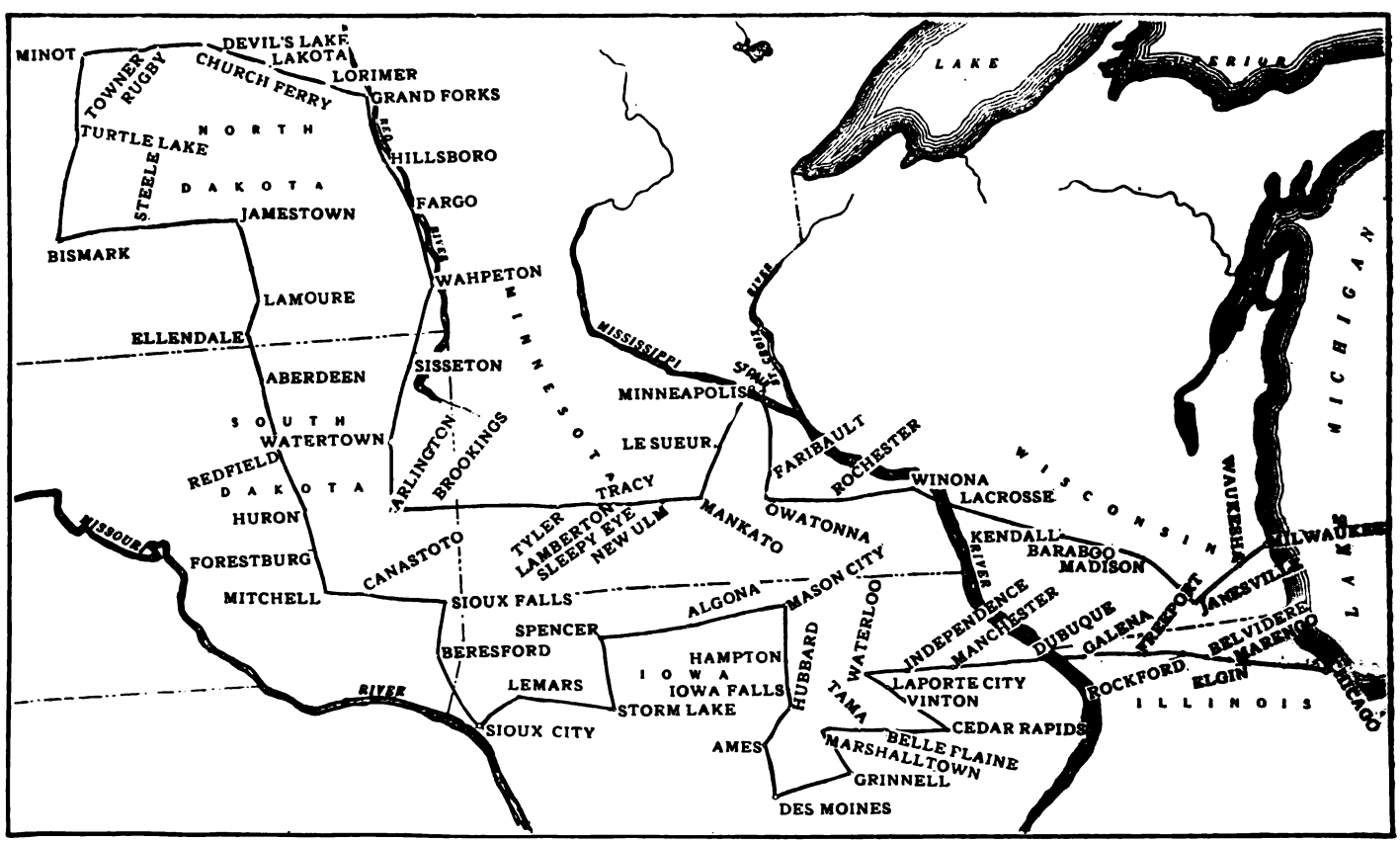
The trucks will pick up loads at different points where arrangements have been made for such loading and will transport these to towns along the route. Practically any load will be hauled and the saving of time will be demonstrated and the cost estimated so that the farmers will have substantial knowledge with which to make comparisons of the value of trucks as against animal haulage.

Demonstration of Truck Utility.

The utility of the different types of bodies will be explained and these will be either standard or special designs for carrying grain, corn, oats, loose and baled hay, vegetables, fruits, dairy products, eggs, poultry, cattle, for general work, so that their values may be compared with conventional bodies.

The itinerary has been arranged to include six states, Illinois, Iowa, South Dakota, North Dakota, Minnesota and Wisconsin. It will pass through 72 different towns and cities in which there will be shows ranging in length from one hour to two days. The shows will be all in the open, but the lengths will be dependent upon the size of the communities and the time of the day.

For instance, arrival may be made in a town where the caravan will remain during the night. The show may be that evening if early departure is necessary, or it may be the next morning, or both evening or morning. In some instances the show may be begun in the evening and continued through the next day, the departure being the morning of the second day, in one or two an afternoon and evening, and at Devil's Lake, N. D., and Fargo, N. D., the caravan will arrive in the evening, will show the two days following.



The Route of the National Motor Truck Development Tour, Which Will Start from Chicago, Aug. 4, and Cover 2778 Miles in Six Northwestern States in 62 Days, Staging 72 Shows and Making Demonstrations of Work.

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ACCESSORIES FOR THE TOURIST

Articles That Come In Handy When Out On the Road

CARRYIT WITHU BOAT.

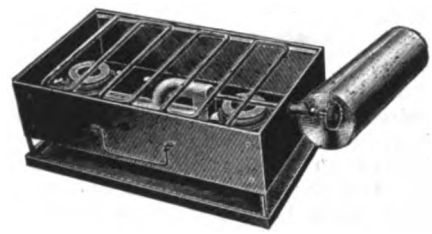
The "Carryit Withu Boat" is made by the Battle Creek Boat Co., Battle Creek, Mich. It fastens on the side of the automobile. The boat can be assembled in five minutes.



Carryit Withu Boat.

FOLDING GASOLINE COOK STOVE.

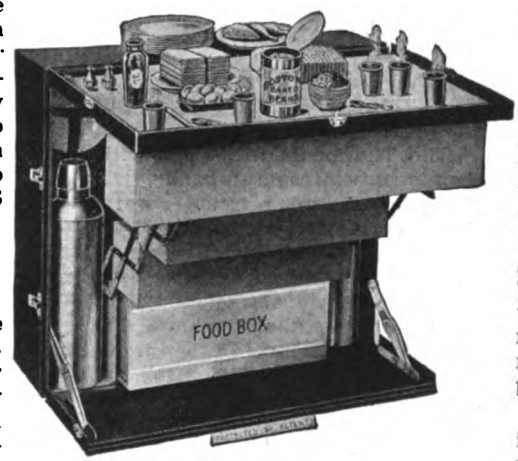
The Folding Gasoline Cook Stove, with two burners, closes into the smallest space, yet affords the advantages of a kitchen. It burns ordinary gasoline. There are no lose parts to assemble or become lost. When folded all parts are enclosed easily in the case, which fastens securely. This is a simple and serviceable cooking apparatus for motor tourists. It is sold by the Abercrombie & Fitch Co., Madison avenue and 45th street, New York. Price, $8.



Folding Gasoline Cook Stove.

AFFA FOLDING TABLE.

The Affa Folding Table for campers and tourists is made by the Affa Specialty Co., 34 Southbridge street, Worcester, Mass. It slips under the floor mat of the automobile and is out of the way. It can be assembled in less than two minutes. The table is made entirely of steel, the top galvanized and the frame finished in black enamel, baked on. The maker claims it is the lightest and most compact folding table on the market. Every part snaps into place with the hands, no tools being required. It is large enough for four persons comfortably. It also makes a good card table. The price is $6 prepaid.



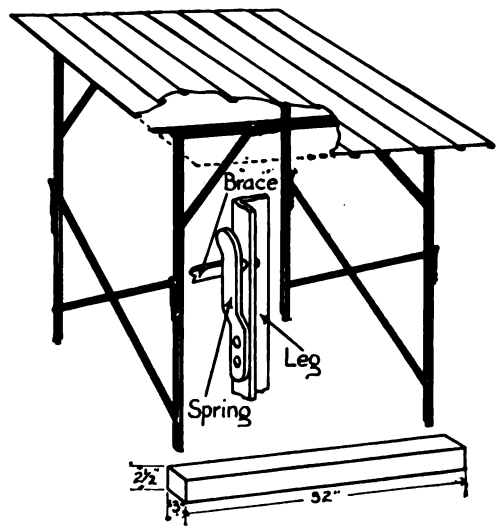
Motor Luncheon Cases.

THEROZ BLUE FLAME STOVE.

The Theroz Blue Flame Stove is the culmination of an idea that there was a big field for a device of this kind for motoring and outdoor use, fostered by the success met by the Theroz Field Stove, which was designed and manufactured for the Red Cross for the use of its workers abroad. In order that it would be practical the metal used in its manufacture is a rust proof iron and trimmings are of copper. The stove weighs seven pounds. It is readily portable and it serves as a carry-all for provisions and utensils when not "in action." The stove insures a hot meal wherever and whenever wanted, irrespective of wind or weather. There are two burners, with a cooking surface area of eight by 16 inches. The stove is sold by the Theroz Co., Woolworth Building, New York.



Theroz Blue Flame Stove.



Affa Folding Table.

MOTOR LUNCHEON CASES.

The Knickerbocker Case Co., Knickerbocker Building, Chicago, offers a variety of motor luncheon cases. No. 4 case (illustrated) is portable and stands alone anywhere. There are three hinged trays and a bottom compartment for one-quart vacuum bottles or jars. The cover serves as a table. The case is made of artificial leather covered and lined and sells for $5.

HAWKEYE PICNIC REFRIGERATOR.

The Hawkeye Picnic Refrigerator enables one to enjoy a cool, refreshing lunch. With it one can have ice cold drinks, cool, fresh butter that doesn't melt, sandwiches and salads that are fresh and appetizing. It keeps the food just as clean and sanitary as does the ice box at home. This device is made by the Burlington Basket Co., Burlington, Ia.

COMBINATION AUTO TENT AND COVER.

The Combination Auto Tent and Cover is designed to enclose the body of the car and provide room for the occupants under one roof. This allows the use of the car as sleeping quarters for children without separating them from the other members of the party. Protection is given to articles stored in the tonneau. The front of the tent is cut to conform to the shape of the dash and the running board, but, if desired, could be made to cover the hood as well, with 20 per cent. additional charge.

The tent is erected by simply throwing one end over the top of the car and stretching the tent out to the side. Of course there are no poles necessary.

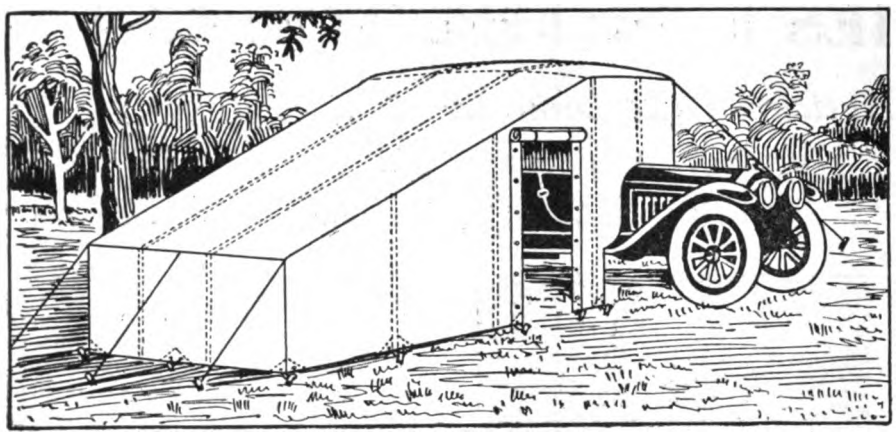
The tent wall is two feet six inches high and seven feet from the car, with the front space of the tent seven feet by the length of the pole. Each tent is shipped complete in a waterproof duffer bag.

The manufacturer is the Baker & Lockwood Manufacturing Co., Seventh and Wyandotte streets, Kansas City, Mo.



Hawkeye Picnic Refrigerator.

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Combination Auto Tent and Cover.

The prices are from $65.80 to $99.35, depending on the material. The floor, made of 10-ounce white duck, will be sewed into any of the tents for $11 extra. In ordering, specify name and model of car.



Delta Electric Lantern.

DELTA ELECTRIC LANTERN.

The Delta Electric Lantern would be especially handy for tourists who desire to camp out at night. Its extra powerful silver plated reflector throws a strong and intense white light scores of feet all around. It uses two ordinary No. 6 dry batteries. It is made by the Delta Electric Co., Marion, Ind., and sells for $3.50 postpaid, fully equipped with batteries and ready for use.



Acorn Uni-Lite.

ACORN UNI-LITE.

The Acorn Uni-Lite is for use both indoors and outdoors as a lantern or a lamp. The maker claims that it can be burned in any position and can be knocked over or rolled on the ground while lighted without affecting the light and without danger of damaging the lamp. It is made by the Acorn Brass Manufacturing Co., 426 South Clinton street, Chicago, and retails for $9. It is sent on 15 days trial.

THERMOS BOTTLE CASES.

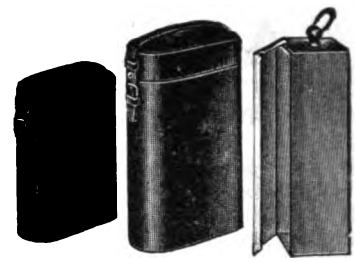
The Thermos Bottle Case with lunch box is sure to come in handy. The case is made of strong frame covered with black grained enameled duck. The food box is made of fine quality metal highly polished. If desired an extra bottle may be used instead of the food box. This is sold by the Abercrombie & Fitch Co. Prices range from $4.75 for the pint case with lunch box to $8 for the two-quart case with lunch box. The thermos bottle, pint size, sells for $3.50 and quart size for $5.25.

DUST-TITE DUFFLE BAGS.

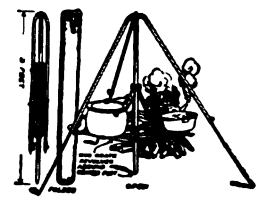
The Dust-Tite Duffle Bags, made by the Baker & Lockwood Manufacturing Co., Kansas City, Mo., carries articles most compactly and conveniently. It is made of khaki colored cloth that will not show soil, and is strongly reinforced and well sewed. Each bag has an extra flap inside the mouth to protect the contents from dust sifting into the open end. There are two strong handles on each bag for carrying and tying on to the car. The tonneau size bag, 12 inches in diameter by 27 inches long, sells for $3.50, and the running board size, 16 inches in diameter by 36 inches long, for $6.25.

UMBRELLA CAMP STOVE.

The Umbrella Camp Stove is said to be the only camp stove with a revolving grate. The long and adjustable legs of the stove, forming a tripod, make it just as practicable to use upon the hillside as upon the level, and the revolving grate is just as easy to revolve and is always level. The stove was especially designed to cook over or by any sized camp fire. It is manufactured by the



Thermos Bottle Cases.

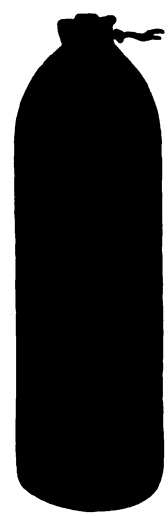


Umbrella Camp Stove Co., Mt. Vernon, Wash., and sells for $7.50, including a canvas case.

FOLDING CAMP STOVE.

The American Folding Camp Stove, made by the Baker & Lockwood Manufacturing Co., Kansas City, Mo., sells for $10.84. It meets the requirements for a dependable, compact camp stove. It is convenient and easy to operate and is ready for business in a jiffy. Simply remove the cover, place the tank in position and the stove is ready to light. There are no loose parts to become lost, nothing to screw together or assemble, no alcohol or torch required to light it.





Dust-Tite Duffle Bag.

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Vacuum Bottle Cases.

VACUUM BOTTLE CASES.

The Warren Vacuum Bottle Cases, manufactured by the Warren Leather Goods Co., Worcester, Mass., are nicely made and lined and are intended to give the best possible protection to the bottles. Experience has proved that they are well worth their cost, not only for protection, but for ease and comfort in handling and carrying the bottles. The strap over the top forms an excellent handle. The company does not furnish bottles. Prices for the cases range from $4 to $10 for those made of brown smooth cowhide and black long grain cowhide leather, and from $1.75 to $5 for artificial leather cases.

TYCOS WEATHER BAROMETER.

With the Tycos Weather Barometer it is claimed the tourist can tell the weather 24 hours ahead. It is an aneroid barometer adjustable for the altitude of any locality below 3500 feet, and responds at once to the slightest changes. It is made by the Taylor Instrument Companies, Rochester, N. Y., and sells for $12.

SPECIAL AUTO COT.

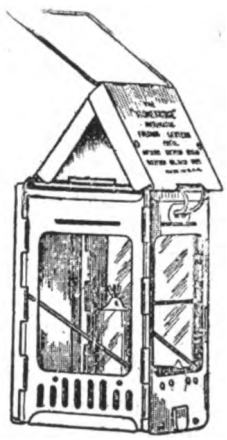
The Special Auto Cot or Bed is made by the Baker & Lockwood Manufacturing Co., Kansas City, Mo. It folds into a neat package five by six inches by three feet two inches. The manufacturer claims that it is the strongest, lightest and most compact double-fold camp bed made, and that it is easier to open and close and folds in less space than other cots. The price is $6.80.



Weather Barometer.

FOLDING LANTERN.

A folding lantern is well worth taking along on a tour. The one illustrated is



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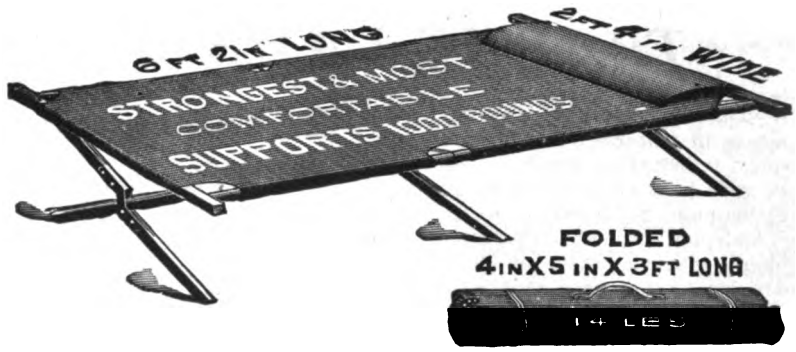
made by the C. H. Stonebridge Manufacturing Co., 21 Warren St., New York.

MOTOR LUNCH KITS.

Motor Lunch Kits, made by the Warren Leather Goods Co., are splendid for tourists. No. 1723 is fitted for four persons. It has a black enamel covering with a washable and waterproof lining in cover. Four knives, four each of forks, teaspoons and enamel plates and cups, a salt and pepper box and one large size metal food box are furnished. There is provided a space for holding a quart vacuum bottle, but the company does not furnish the bottles. The size of the kit is 15¼ by 5½ outside measure, and the list price is $15. No. 1725 is fitted for six persons, the price being $20.

MAKETLA BLANKETS.

Blankets made of the same material that went into blankets for the soldiers during the war are offered to the motorist by the Maketla Co, 611 Drexel Building, Philadelphia. Style A blanket makes a good auto robe It comes olive drab or oxford gray, 42 by 66 inches, weighing three pounds, and sells for $7 each, or three blankets for $19.50.



Special Auto Cot.

GLOWNITE UTILITY WATCH.

The Glownite Utility Watch will come in handy for motorists who camp out. It is sold by J. F. Mansfield, wholesale distributor, 9 Maiden lane, New York.





Maketla Blankets.



Motor Lunch Kit.

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TRAFFIC LAWS IN VARIOUS STATES

Regulations In Effect for Non-Resident Motorists

Alabama—Exemption from registration same as in motorist's home state; must display registration numbers in accordance with laws of home state; exempted vehicles must not be used for hire while in Alabama; speed, "reasonable and proper" with maximum of 30 miles an hour; local ordinances prohibited.

Arizona—Exemption from registration for six months.

Arkansas—Exemption from registration same as in motorist's home state.

California—Non-residents exempt from license for three months, but must register with highway vehicle department within 24 hours of arrival in state; no charge for such registration; speed, "reasonable and proper" with maximum of 30 miles an hour; local ordinances prohibited.

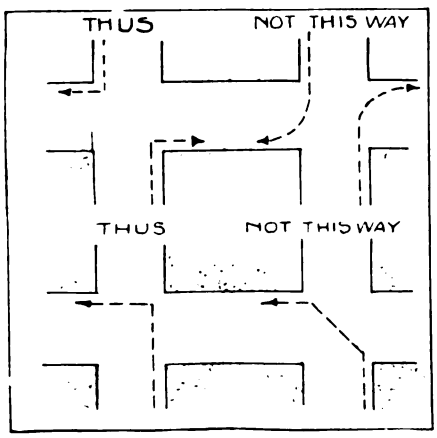
Colorado—Non-residents exempt for three months, but must procure free registration tag from the secretary of state; exemption does not apply to trucks and trailers.

Connecticut—Exemption for 30 days; home state license tags front and rear; speed, "reasonable and proper" with no maximum limits fixed by the new state law effective this year; full stop 10 feet in rear of standing street car.

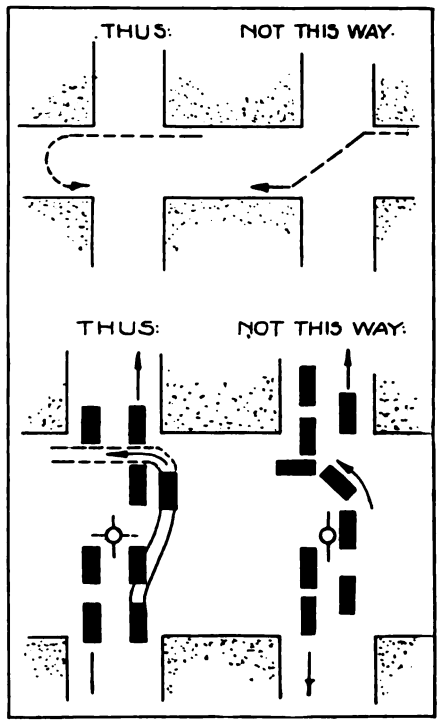
Delaware—Same exemption as in motorist's home state; speed on streets where buildings are less than an average distance apart of 100 feet, one mile in four minutes; at curves and intersections, one mile in eight minutes; where buildings are more than 100 feet apart, one mile in two minutes, 24 seconds; descending steep hills and passing other vehicles, one mile in five minutes; elsewhere, "reasonable."

District of Columbia—Same exemption as granted in motorist's own state; motorist "shall proceed with great caution, especially on narrow streets, in making turns, in crossing other streets and in passing other vehicles or street cars;" dazzling lights prohibited; no unnecessary sounding of warning signals.

Florida—Same exemption as in motorist's home state; speed, "reasonable and proper," with maximum of 25 miles an hour; three miles an hour maximum when approaching street car that has stopped or is about to stop; 10 miles an hour when operator's view of road and traffic is obstructed; dimmers necessary.



Turning Into Another Street.



Changing Direction to the Left at a Street Intersection.

Georgia—Exemption for 30 days; speed, "reasonable and safe" with maximum of 30 miles an hour; dimmers necessary.

Idaho—Same exemption as in motorist's home state; speed, "careful and prudent," with maximum 30 miles an hour.

Illinois—Exemption for 60 days if home state grants same privilege; speed, "reasonable and proper" with maximum of 25 miles an hour; license tags front and rear; lights must be dimmed when within 250 feet of approaching vehicle.

Indiana—Exemption for 60 days if motorist's home state grants same privilege; speed, "reasonable and prudent;" in built-up sections, 10 miles an hour; towns and villages, residential sections, 15 miles; where view is obstructed, six miles; elsewhere, 25 miles; must not throw spot lights when passing vehicles.

Iowa—Exemption same as in motorist's home state; speed, "careful and prudent," with maximum of 25 miles an hour; must not throw spot lights when approaching vehicle.

Kansas—Exemption for 60 days; speed, "reasonable and proper," with maximum of 40 miles an hour; unlawful to turn spot light on approaching vehicle; dimmers necessary.

Kentucky—Exemption same as in motorist's home state; speed, "reasonable and proper;" closely built-up business sections, 10 miles; residential sections, 15 miles; elsewhere, 20 miles; spot lights prohibited except in emergency.

Louisiana—Same exemption as in motorist's home state.

Maine—Exemption for 30 days; speed, "reasonable and proper;" five miles an hour when passing places designated with official signs, "Automobiles Go Slow;" eight miles an hour when view of road or traffic is obstructed; 25 miles an hour in open country; in compact sections, 15 miles an hour provided signs, "Speed Limit, Fifteen Miles," are posted.

Maryland—Exemption for two periods of eight consecutive days.

Massachusetts—Exemption same as in motorist's home state; number plates front and rear; speed, "reasonable and proper;" in thickly settled districts, 15 miles; elsewhere, 20 miles; where view is obstructed, eight miles; cities and towns have special regulations as to speed; "in approaching or passing a car of a street railway which has been stopped to allow passengers to alight from or board the same, the operator of every motor vehicle shall not drive such vehicle within eight feet of the running board or lowest step of the car then in use by passengers for the purpose of alighting or boarding, except by the express direction of a traffic officer, or except at points where passengers are protected by safety zones."

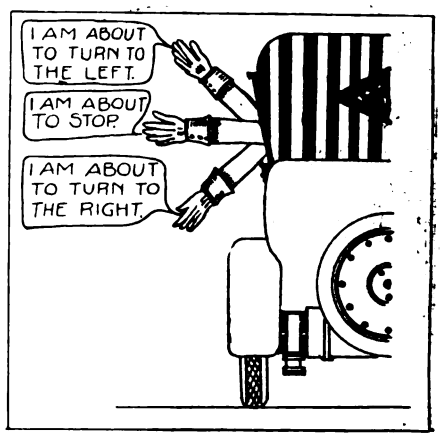
Michigan—Exemption for 90 days if motorist's home state grants similar exemption; speed, "reasonable and proper;" maximum, 25 miles on highways; in built up portions of cities and villages, 10 miles; in other portions of cities and villages, 15 miles; signs of local authorities relative to speed in parks must be obeyed; dimmers required.

Minnesota—Exemption for 60 days.

Mississippi—Exemption for 60 days; speed, "reasonable and proper;" maximum, 15 miles in incorporated cities, towns and villages; elsewhere, 30 miles.

Missouri—Exemption for 20 days.

Montana—Registration not required for non-residents temporarily sojourning in the state; speed, "careful and prudent;" cities and towns have local speed ordinances.



Code of Signals.

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Nebraska—Exemption for 30 days; speed, "reasonable and proper;" maximum, 35 miles an hour.

Nevada—Exemption for 30 days; cities and towns may pass speed ordinances, but must not set minimum less than 12 miles an hour.

New Hampshire—Exemption for 10 days; non-residents may register for July, August and September at half annual fees; speed, "reasonable and proper;" thickly settled districts, 15 miles; where view is obstructed, 10 miles; elsewhere, 25 miles.

New Jersey—Exemption for not more than 15 days, if home state grants similar exemption; exemption also applies to tourists from Canada; speed, one mile in seven minutes upon sharp curves or when turning corners; one mile in four minutes at junction of intersection of prominent cross road in open country; one mile in five minutes in built up sections; one mile in four minutes within 200 feet of a horse; open country, 30 miles.

New Mexico—Exemption for 60 days.

New York—Same exemption as granted in motorist's home state; speed, "careful and prudent;" maximum, 30 miles an hour; New York City has its own speed laws and regulations; headlights and auxiliary lights must not rise above 42 inches from ground and 75 feet in front of lamps.

North Carolina—Exemption for same period as in motorist's own state, not exceeding 60 days; speed, "reasonable and proper."

North Dakota—Exemption same as in motorist's home state.

Ohio—Same exemption as in motorist's home state; speed, eight miles an hour in municipality; 15 miles in other sections of municipality; 25 miles outside of a business and closely built up sections in a municipality.

Oklahoma—Same exemption as in motorist's own state.

Oregon—Exemption for 30 days; speed, "careful and prudent;" maximum, 30 miles an hour.

Pennsylvania—Same exemption as in motorist's own state; speed to be reasonable, with maximum of 25 miles an hour; dimmers compulsory.

Rhode Island—Exemption for 10 days in the calendar year; speed, "reasonable and proper;" in built-up sections, 15 miles an hour; elsewhere, 25 miles; "no person shall allow any motor vehicle operated by him to stand unattended on any public highway without first locking or making fast such motor vehicle in such manner as to prevent such vehicle from being set in motion contrary to the will of the owner or the person in charge thereof."

South Carolina—Same exemption as in motorist's home state.

South Dakota—Same exemption as in motorist's home state; speed, "careful and prudent;" maximum, 25 miles an hour.

Tennessee—Exemption for 30 days.

Texas—Same exemption as in motorist's home state; speed, "careful and prudent;" 10 miles an hour in business districts in cities of more than 40,000 population; 15 miles in smaller cities; elsewhere, 25 miles; glaring lights prohibited.

Utah—Exemption for 30 days; speed, "reasonable and safe."

Vermont—Exemption same as in motorist's home state; speed must not be "careless or negligent;" in thickly settled districts, 10 miles; elsewhere, 25 miles; special regulations posted on dangerous roads; "when vehicles are approaching each other from opposite directions spot lights shall not be used except when projecting their rays directly on the ground and at a distance not exceeding 30 feet in front of the vehicle."



Scene in Sequoia National Park.

Virginia—Exemption same as in motorist's home state; speed, not greater than 15 miles an hour; cities and towns have own ordinances.

Washington—Exemption for 90 days.

West Virginia—Same exemption as in motorist's home state; speed, consistent with safety; maximum, 35 miles an hour.

Wisconsin—Exemption for non-residents; speed, "reasonable and proper;" 15 miles an hour in corporate cities and villages; elsewhere, 25 miles.

Wyoming—Exemption for 90 days; speed, "reasonable and proper;" maximum, 25 miles an hour.

GENERAL TRAFFIC RULES.

The following rules and regulations for traffic are in effect in a number of states and the larger cities.

1. All vehicles will keep to the right.

2. Vehicles meeting will pass on the right.

3. Vehicles moving slowly must keep near the right curb, allowing those of increased speed to occupy the center of the street.

4. Vehicles turning into another street to the right will keep to the right. When to the left continue to the opposite side of the lateral street before changing direction to the left.

5. Vehicles will not be allowed to stop with the left side to the curb, nor on any street crossing. When desiring to stop on the left side of the street make a complete circle, bringing the right side of the vehicle to the curb.

6. If it is desired to change direction to the left at a street intersection where a patrolman is on duty to regulate traffic:

Enter the street you wish to turn into on signal from officer.

Keep to the right so as to allow those following you to pass on your left and proceed.

Watch and listen for signal from officer for traffic to move in the direction you wish to go.

Turn to the left and move forward.

7. In turning out, stopping or backing up, the following code of signals shall be used:

(a) Hand extended up at an angle of 45 degrees means turning out to the left.

(b) Hand extended horizontally means going to stop.

(c) Hand extended down at an angle of 45 degrees means turning out to the right.

(d) Ample warning shall be given before backing up, either visible or audible, so as to avoid injury to other vehicles and pedestrians.

CANADIAN TOURING.

American tourists do not require passports. If the automobile is to remain in Canada less than 30 days a touring permit may be obtained from the Canadian customs officers at the port of entry. This permit will allow the car to be operated in the Dominion for one month without securing a customs bond or depositing duty.

American- licenses and car registrations are reciprocally recognized in the Province of Quebec, and in other provinces they are valid for from three weeks to three months.

If the tourist is to spend more than 30 days in Canada, a customs bond valid for six months must be obtained, guaranteeing re-exportation of the car within that period, and Canadian registration must be effected and licenses obtained.

In order to bring the car back into the United States, duty free, on the return journey, it must be registered with the American customs office at the international border when leaving the United States, and a certificate of export obtained.

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PROJECTED NATIONAL HIGHWAYS

Following is a list of projected national highways:

Routes Coursing East and West.

1. Lincoln Highway: New York City to San Francisco via Philadelphia (with feeder into Washington, D. C.), Pittsburgh, Lima, Joliet, Omaha, Cheyenne, Salt Lake City, Ely, Reno.

2. National Old Trails Road: Washington to Los Angeles via Cumberland, Wheeling, Columbus, Indianapolis, St. Louis, Kansas City, Dodge City, Trinidad, Albuquerque, Holbrook, Flagstaff, Needles and Barstow.

3. Pikes Peak Ocean-to-Ocean Highway: New York or Philadelphia (with Boston and Washington extensions), Harrisburg, Pittsburgh, Columbus, Springfield, St. Joseph, Belleville, Colorado Springs, Rifle, Salt Lake City (with undetermined routes via Ogden, Winnemucca and Sacramento to San Francisco, also via St. George, Las Vegas and Redlands to Los Angeles, following the Arrowhead Trail).

4. Yellowstone Trail: Plymouth Rock to Puget Sound via Hartford, Kingston, Elmira, Akron, Fremont, Ft. Wayne, Chicago, Oshkosh, Abbottsford, Twin Cities, Ortonville, Mobridge, Fallon, Livingston (with side route to Yellowstone National Park), Missoula (with side route to Glacier National Park), Spokane, Walla Walla, Seattle and Tacoma.

5. Roosevelt National Highway: Montauk Point, L. I., to San Francisco via Oyster Bay, New York City, Albany, Syracuse, Buffalo, Cleveland, Mansfield, Columbus, Cincinnati, Lexington, Louisville, St. Louis, Kansas City, Limon via Denver or Colorado Springs, Grand Junction, Salt Lake City, Ely, Goldfield, Lone Pine through Roosevelt National Park to San Francisco or Los Angeles. (This route coincides with the Midland Trail for most part. The Midland Trail starts from Washington and runs through Virginia and West Virginia connecting with the Roosevelt National Highway at Lexington, Ky.)

6. Southern National Highway: Washington to San Diego via Richmond, Clarksville, Greensboro, Salisbury, Asheville, Knoxville, Nashville, Memphis, Little Rock, Dallas, Roscoe, Roswell, El Paso, Tucson, Phoenix and Yuma.

7. Old Spanish Trail: Miami or Ft. Myers, Lake City via Jacksonville or Tampa, Tallahassee, Mobile, New Orleans via Shreveport or Galveston to Dallas, Midland, El Paso, Douglas, Tucson, Phoenix, San Diego to Los Angeles.

8. Bankhead Highway: Washington to Los Angeles via Richmond, Clarksville, Durham, Greensboro, Salisbury, Charlotte, Spartanburg, Greenville, Athens, Atlanta, Birmingham, Jasper, Tupelo, Memphis, Little Rock, Dallas, Ft. Worth, El Paso, thence to coast over route not yet determined upon.

9. National Parks Highway: New York to Seattle via Albany, Buffalo, Cleveland, Chicago, Milwaukee, La Crosse, Twin Cities, Fargo, Bismarck, Glendive, Livingston (side trip to Yellowstone National Park), Butte, Missoula (side trip to Kalispell and Glacier National Park), Wallace, Spokane, Vantage Ferry and Snoqualmie Pass.

10. Dixie Overland: Savannah to Los Angeles via Oglethorpe, Montgomery, Vicksburg, Shreveport, Dallas, Roscoe, Roswell, El Paso, Douglas, Tucson, Phoenix, Yuma, San Diego.

Routes Coursing North and South.

11. Atlantic Highway: Quebec or Calais to Miami via New York City, Philadelphia, Washington, Richmond, Raleigh, Columbia, Augusta, Savannah and Jacksonville.

12. Pacific Highway: Vancouver to San Diego via Seattle, Olympia, Portland, Eugene, Redding, San Francisco, Santa Barbara and Los Angeles.

13. Dixie Highway: Chicago and Mackinaw City to Miami and Marco, Chicago to Indianapolis via Danville; Mackinaw to Indianapolis via Grand Rapids or to Chattanooga via Saginaw, Detroit, Dayton, Knoxville; Indianapolis to Chattanooga via Louisville and Nashville; Chattanooga to Marco, Fla., via Atlanta, Tallahassee, Gainesville and Bartow; Chattanooga to Miami via Madison, Waynesboro, Jacksonville and Titusville with connections between Macon and Jacksonville, Lake City and Jacksonville, Arcadia and Palm Beach and Marco and Miami.

14. Jefferson Highway: New Orleans to Winnipeg via Shreveport, Denison, Muskogee, Joplin, Ft. Scott, Kansas City, St. Joseph, Des Moines, Mason City, St. Paul, Minneapolis, Wadena to Winnipeg.

15. Jackson Highway: Chicago or Niagara Falls to New Orleans or Selma; Chicago to Louisville via Lafayette, Indianapolis and Brownstown; Niagara Falls to Louisville via Cleveland, Columbus and Lexington; Louisville to Nashville via Hodgensville and Scottsville; Nashville to Selma via Fayetteville, Gadsden, Birmingham and Montgomery, Nashville to New Orleans via Tuscumbia, Brookville, Meridian and Logtown.

16. Meridian Road: Winnipeg to Galveston or Laredo via Fargo, Watertown, Columbus, Wichita, Lawton, Ft. Worth, Waco to Galveston via Houston or to Laredo via Austin and San Antonio.

17. King of Trails Highway: Winnipeg to Galveston or San Antonio via Fargo, Sioux Falls, Omaha, Kansas City, Muskogee, Dallas and Waco.

18. Lakes to Gulf Highway: Detroit, Ft. Wayne, Indianapolis, Louisville, Nashville, Tuscumbia, Memphis, Jackson to New Orleans.

19. National Park-to-Park Highway: Connecting up the National Parks of the Rocky Mountains and Pacific Slope beginning and ending at Denver. Route via Cheyenne, Lost Cabin, Yellowstone Park, Butte, Kalispell, Spokane, Seattle, Portland, Medford, San Francisco, Yosemite, Mohave, Los Angeles, Needles, Grand Canyon, Mesa Verde and Colorado Springs.



(Copyright by Kisser Photo Co. for Great Northern Railway.)

Pack Train on Buck Creek Pass, Near Glacier Peak, Cascade Mountains.

FOUR-FOLD HIGHWAY SYSTEM.

The National Highways Association states:

"All attempts to develop roads by first building local roads have failed. Not until trunk lines were built was there any material advance in road building. These trunk lines brought about the desire for and building of the local feeder lines. Otherwise there was no desire or reason for the existence of such local feeders. Branch railroad lines existed after the trunk lines were established—otherwise they could not have existed. It must be the same with roads."

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LATEST MODES FOR THE WOMAN MOTORIST

Up-to-the Minute Hints on What to Wear When Motoring.

By Mrs. A. Sherman Hitchcock.

SUMMER'S hot waves are forcible reminders of green fields, mountain breezes and the cool breath from lake and ocean, and the woman who can enjoy motoring, finds this form of pleasure extremely welcome at this season of the year. Whether it is a long tour, a week-end visit, a day's trip or merely a little spin at night to cool off before going to slumber, it is the ideal recreation for out-of-doors.

For the motor woman to be well equipped for the various kinds of motoring means something more than a coat and a hat. It means rather, coats and hats, dresses and accessories. Of course, everything depends upon one's plans for the touring season and due consideration must be given to where she is going to wear her clothes. If the motor trip is to be an outing in the country, a good loose wool cover-all coat, wool sweater, tweed or mohair skirt and two or three simple blouses may be taken along, and adding a jar of sunburn cream and the toilet articles and night clothes the outfit will be quite sufficient for all needs.



Photo by Joel Feder.

A Very Smart and New Motor Coat with All Sorts of Comfortable Ways in Which to Guard Against Wind and Weather Is Made of This Wonderfully Soft Tan Leather.



The Auto Soire Cape Coat Is the Very Thinnest and Lightest Weight Rain and Dust Resisting Garment Ever Made for the Motorist. It Is Lovely in Appearance, Resembling the Garment of Silk, and Has Absolutely No Weight.

On the other hand, if the party is preparing for an over-Sunday stay at a smart country house, where at least two dinner frocks and a dancing frock will be needed, beside a dainty morning frock, and tennis or golf garb, a motor trunk with plenty of trays will be none too commodious to carry the requisite paraphernalia.

Clothing Must Be Correct.

The average over-Sunday motorist, however, avoids the more extensive wardrobe and carries her belongings in the conventional suit case, whose capacity is almost unlimited. Nearly every woman can pack more into a suit case than she wants to carry.

The choice of motor equipment is a most important question and every woman will agree with me that in order to thoroughly enjoy a motor trip the clothing must be of the correct kind and well chosen. If a woman is doing her own driving on a tour—and it is one of the commonest sights in the world to see her doing it, it is not necessary to be disguised as a chauffeur, and yet touring in a street dress is equally absurd. Motor raiment for touring should be sensibly practical, but not necessarily exaggeratedly so. It should be individual and distinctive and always remain within the limits imposed upon it by your own comfort. It must be admitted that in selecting and wearing motor clothes, men excel women. This is without doubt because a man usually insists upon the durability of fabric and color and the elimination of all unnecessary frills. The woman who aims at these same things is sure to achieve an unmistakable smartness, and when she goes away on a week-end visit a most practical and severe top coat may cover the most feminine of silk frocks, but there will be nothing to flutter and spoil her mannish simplicity of line.

The top coat is a vital part of motor touring and it is to be seen in many fascinating models this season, and in a wide variety of fabrics. Wools, mohairs, tweeds, silks, linens and the new leathers. The woman who is not a novice at motoring knows that one may be sufficiently cold on a mid-August night to need the comfort of a warm wool coat. One substantial coat of wool material should always be provided, no matter how many of the charming creations in light weight serge, pongee or mohair the motor woman may be possessed of. Such a coat should invariably be carried in the tonneau, even in the warmest weather, for as soon as the sun drops below the horizon the thin frock may be covered with the smart, warm coat and one is well clothed for the remainder of the journey.

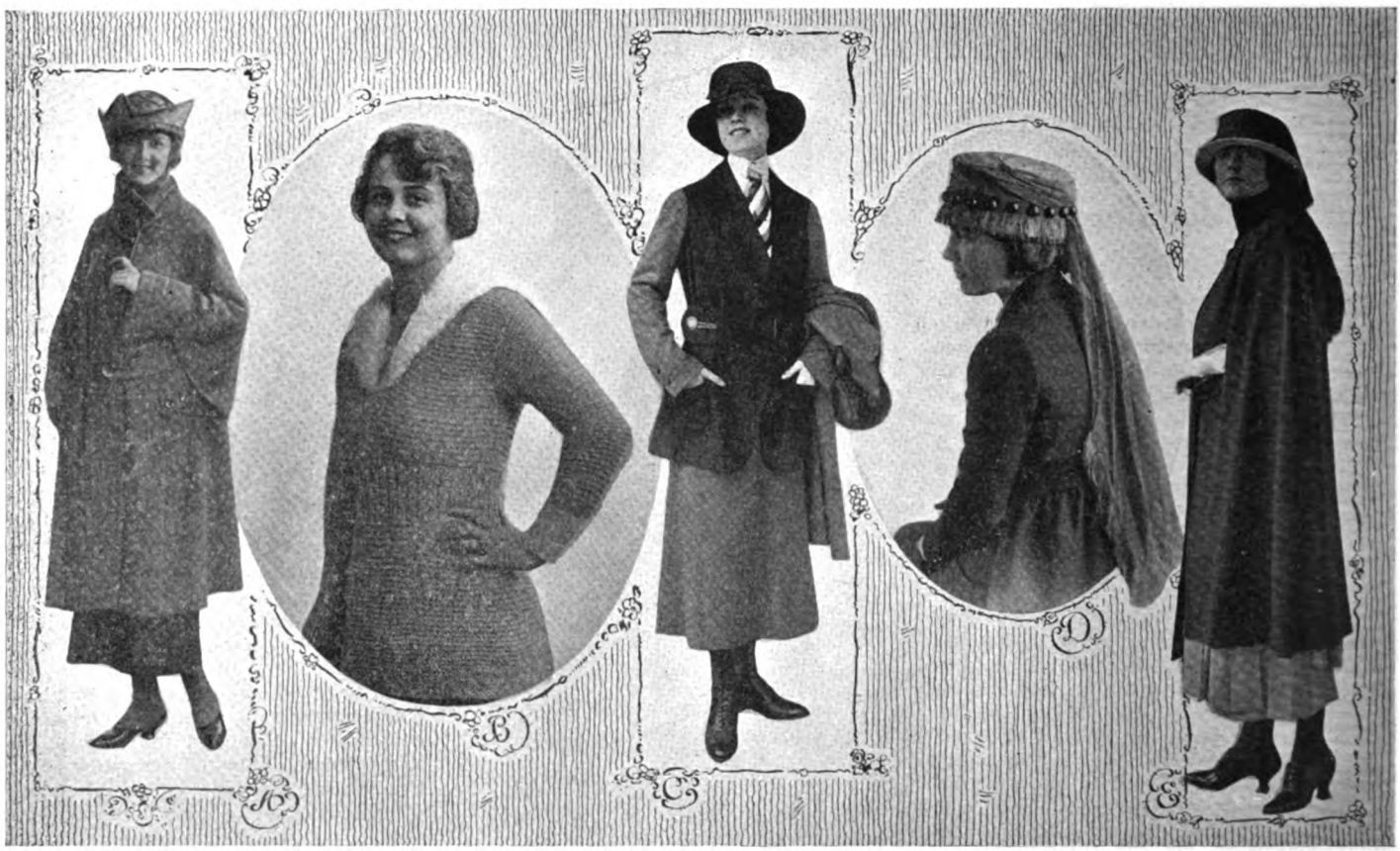
Worumbo Camel's Hair.

There is no material so ideal for motor wear as the Worumbo Camel's Hair, and there is nothing more greatly in fashion's favor this season. Thoroughly comfortable, extremely smart and so light in weight and soft in texture that they are not in the least cumbersome to carry or lift about. All the Worumbo cloths are to be highly recommended, for their wearing qualities are wonderful and they give entire satisfaction in every way. The new models are made in a variety of styles which do not differ greatly, save in minor details, as there seems to be a predilection for the plain, roomy garment, but all the newer coats have the loose back developed in one way or another.

They usually drop from yokes which sometimes are square and hold clustered shirrings, circular to link up with rolling pleats, diagonal at either side from which godets ripple, and flat at the base to permit a slot seam or tapering panel to be inserted. Some of the yokes accentuate the long shoulder line, dropping well over the shoulders and forming the upper part of wide armholes.

There are a very great many motor wraps built on the cape and dolman lines. A lovely Worumbo wool cape has a great collar, cowl in shape, reaching to the waist line in depth. Serge, taffeta and mohair are among the best materials for

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A—Nothing Can Excel the Motoring Coat of Worumbo Camel's Hair; B, the Slip-On Sweater Is a Big Favorite with the Motorist; C, This Smart and Practical Coat Is of Suede Leather and the Sleeves, Skirt and Top Coat Are of Wool Jersey (Photo by Joel Feder); D, This Little Hat of Georgette Crepe Possesses Distinction, Style and the Most Practical Features; E, the Motor Cape Has a Popularity That Knows No Limit.

the summer motor cape. A sand colored taffeta has a deep collar, waist length in depth, of duvetyn in navy blue. Tricolette capes are also in demand and are decidedly handsome.

Nothing will appeal to the woman motorist more greatly then the very new "Americanette's." They are just being brought out and are the most smart and snappy garment imaginable. They come both in leather and in a leather and tweed combination, known as a reversible coat. The leather is a lovely soft flexible quality and is so light in weight that it is not impractical for summer. If desired the collar may be buttoned up close to the neck with its smart leather buttons, and the sleeves fasten snugly at the wrist. Every motorist should include one of the new Raynsters in her touring outfit. There are the most attractive models, combining smart style and practicability. The tweeds are made in various styles, gving the garment a far more attractive appearance than the average storm coat possesses. The silk rubbers are very handsome and are built on severe lines, their beauty consisting of the wonderful sheen of the fabric, while as a utility garment they cannot be excelled. There are also cashmeres and mohairs, all treated in such a manner they are storm proof.

Coats of White Oilcloth.

Perhaps the newest idea of all has just been launched by a noted designer, who advocates motor coats of white oilcloth, the very same simple and humble white oilcloth that covers the simple and humble kitchen table. A model just turned out of the oilcloth is about three-quarters length and is quite full. There are three belts—one at the natural waist line, one above and one below and all fasten at the front with a buckle. The collar may be brought up well about the neck and buttoned, or turned away and the points held down by buttoning to the coat. The sleeves have three little straps in place of a cuff and the straps buckle together, giving an effect similar to the belts of the coat. The lining is of a bright red satin, and a little motor hat accompanying the coat is also of the white oil cloth and red satin. The crown is of tucked satin and it is encircled by two wide bands of the oilcloth which fasten in front with a large buckle.

One of the newest things for the motorist is the Sweater Scarf, so-called, as it seems to answer both the purpose of the sweater and the scarf. It is all wool, three feet wide, nine feet long and is thown over the shoulders like the old-fashioned shawl of our grandmother's day. It is gathered at the waist and held by the belt of the wearer's skirt. Among the very newest of garments for motor wear are wool knitted capes. They are full length capes and gathered to a large yoke and collar of brushed wool. The collar crosses in front, forming a surplice effect and fastens in the back, if preferred.

Belding "Nancette."

Serviceability and becoming effect count for much in motor frocks, and they must first of all fit the occasion. The motorist should, of course, be provided with several, and for each trip select the one befitting that particular occasion. The simplicity and grace of a motor frock is its greatest charm, and the soft materials which are so fashionable are perfectly adapted for this use. The lovely new Belding "Nancette," which comes in the most delectable shades, is one of the smartest fabrics of the season. This lovely material is dressy enough to serve as luncheon or matinee frocks, when going in the car and is ideal for the dinner frock at the hotel when on a tour. The Belding Nancette is a rich, highly lustrous silk of individual weave, with most excellent wearing qualities and is to be highly recommended for the motorist. A charming and appropriate frock to include in the touring wardrobe is of navy blue Nancette, made in one-piece style and having a wide panel back and front. The panels are braided with the new pigtail brand in black in a handsome design and the ends of the panels are finished with wide black silk fringe. A picot edged sash encircles the waist and ties at the left side. The sleeve is long and tight fitting, for while much has been said regarding the return of the short sleeve, it has not been accepted by well dressed women for frocks of this character. The bottom of the sleeves and the edges of the sash are braided, and the neck is the modish "U" neck that is so popular at the present time.

For more severe wear, such as long distance touring and picnic parties, there is nothing better than the popular Nu

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Vogue fabrics, which seemingly never wear out and always look surprisingly fresh under the most adverse circumstances. They combine charming color combinations and are in handsome plaids. A plaid, combining a dull green, brown and black, has a thread of old gold defining the plaids, and made very simply with tiny brass buttons for ornamentation, is wonderfully smart and fetching. Another Nu Vogue is a combination of blue, green and brown, with a thin stripe of red running through.

Devonshire Cloth.

The Devonshire Cloth is also another sturdy material, fashionable and attractive. There are many stripes and plaids, and in the plain colors there are some lovely shades. One motorist that I know includes three frocks of Devonshire Cloth in her motor touring outfit. They are made exactly alike, having a short skirt about two yards in width, and a plain waist with a tunic which falls to about five inches of the bottom of the skirt. There is a five-inch belt, set below the natural waist line, thus giving the desired long waisted effect. The sleeve is short and of the bell variety. The belt, bottom of sleeve and bottom of the tunic is braided in white cotton soutache and the waist buttons directly through the front with white pearl buttons. One frock is brown Devonshire, one is a deep blue and the other is rose.

In motor millinery the small hat is most popular with the average woman, but there are some women who like to have a little more dressy hat with them in case they go about a little when stopping in some city. When the larger hat is worn the popular idea is to cover it completely with a large veil of chiffon cloth when upon the road. This veil may be selected in some bright and attractive shades and is really wonderfully smart looking and preserves the hat from dust and sun. Kid is being used very successfully for motor hats. They are small, having the crown trimmed in cut-out kid flowers, which is an entirely new idea.

Tams Also Very Good.

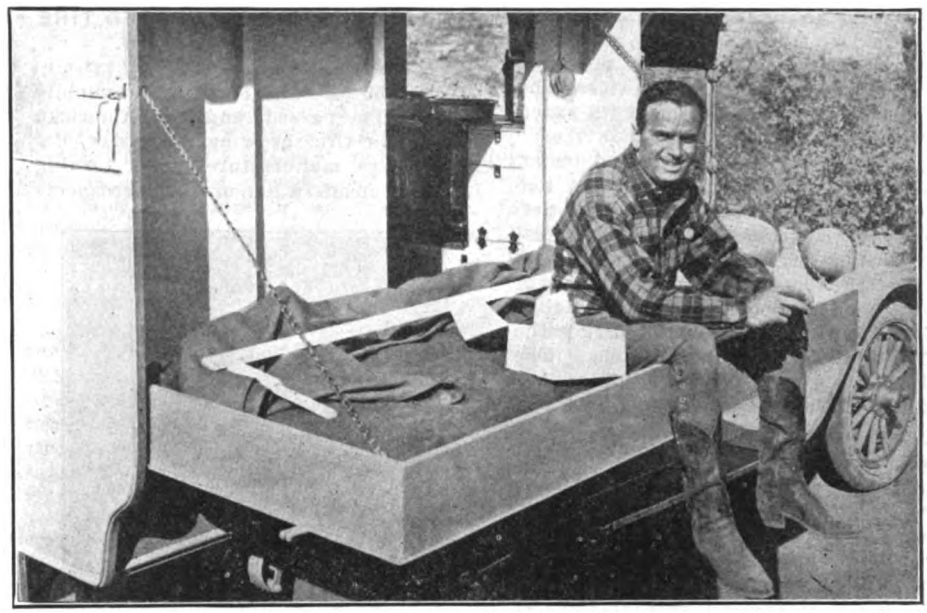
Tams are also very good for motor wear and moire and taffeta are being much used. Veils are attached to motor hats for the greater part. A small turban of navy blue Georgette has an eight-inch veil of filet mesh drooping down over the face and a long Georgette veil at the back which may be wound around the head and neck if desired. Kid and taffeta combinations are prominently used in smart motor hats. Little sailor shapes with crown tips and upper brims of taffeta and crown sides and facings and sometimes button trims of the kid in contrasting color. Mesh veils are shown on these hats, with the front portion of the veil that fits under the chin on a neck band of taffeta or moire that fastens with a snap, the back part of the veil hanging free at the back.

Have you seen the Tweedie Boot Tops? Nothing has ever been invented which will give the motor woman greater satisfaction. Nearly all women prefer to wear a pump or oxford at all times, but wish protection about the ankles when touring and also when the days and evenings are chilly. Very many women do not like the regulation spat, and certainly in the majority of cases they are ill-fitting and decidedly dowdy appearing. The Tweedie Boot Tops are the acme of perfection in fit and appearance. They are made of the splendid Worumbo Wul-Buk in white, taupe, gray, chamois, fawn and champagne. There is no unsightly buckle and the appearance is of a smart cloth topped shoe. They conform to the shape of the foot as does a glove to the hand and are an accessory which no motorist should be without. The Tweedie Boot Tops may also be had in moire, corduroy and cordigan cloth.

The summer tourist who wishes comfort, as well as smart appearance, should wear silk gloves in a shade conforming to her other raiment. They are cool and comfortable and have the added attraction of cleanliness, for they may be washed out over night and present an immaculate appearance in the morning. Time was when the glove of silk was an ill-fitting and detestable affair to the particular woman, but if a first class make is selected the fit will be perfect and the wearing qualities all that one could ask. Attention should be given to the glove of heavy silk, for it is such a glove that will give the perfect fit and good appearance. The Mohawk silk gloves are without question the most satisfactory silk glove to be found. The quality is unusual and the embroidery on the backs is smart and new. They come in pongee, gray, tan, brown, silver and gold, with self or two-tone embroidery.

DOUGLAS FAIRBANKS KNOWS HOW TO ENJOY HIMSELF WHEN TOURING

Popular Movie Artist Doesn't Have to Worry About Hotels and Restaurants When He's on the Road.



Douglas Fairbanks in His House Car.

DOUGLAS FAIRBANKS, the movie actor, doesn't worry about hotels and restaurants while scouring the western plains for suitable locations for his scenes. He travels in a "Dodge Brothers House Car," which is the name he gave the strange, but cozy vehicle designed and built for him by the Albertson Motor Co., Dodge Brothers dealer in Los Angeles.

As the illustration shows the walls of the car form beds when lowered. There is additional sleeping space inside, as well as a complete kitchenette, ice box, electric lights and all the conveniences of home.

The car seems to require no roads to travel on and has a faculty of taking Mr. Fairbanks exactly where he wants to go, regardless of whether the topography makes for smooth sailing or rough.

Mr. Fairbanks was all smiles when an interviewer asked him how he enjoyed his novel car.

"There's nothing like it," declared the noted moving picture star. "I have nearly all the comforts of home. I can go where I want when I want, and have nothing to worry about.

"I used to have to do a mighty lot of worrying about hotels, but never again. This is my own hotel, and it suits me in every respect. I would advise anyone who has to do a lot of traveling to have one rigged up just like it."

"Can you sleep as well in it as you could in a hotel?" he was asked.

"I sure can," was the response. "Why, I never slept better in my life than I sleep in this outfit. A hotel bed can't be compared with it."

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ROWE CALK AND CHAIN CO. TAKES OVER HI-LO JACKS.

The Rowe Calk and Chain Co. announces that it now has the exclusive manufacturing and selling rights for Hi-Lo Jacks, formerly manufactured by the Hi-Lo Jack Co., Worcester, Mass. For some time the Rowe company has been endeavoring to obtain a jack for passenger cars and trucks, which it would be willing to market alongside its now well known Prest-O-Grip traction devices. The Hi-Lo Jack was found to meet its exacting requirements.

The Hi-Lo Jack is constructed on an entirely new principle, that of the toggle joint. While the toggle joint is perhaps one of the oldest and simplest forms of applying power known to man, its use, the company states, has never before been embodied in an automobile jack. It is this feature which makes the Hi-Lo Jack unique in its field. The maker claims that there is no other jack made which increases in lifting power as the load is raised.

A Hi-Lo Jack which is made to lift two tons at seven inches will, the company claims, actually raise a load of five tons at 12 inches—the starting point of an ordinary jack. The Rowe company's anouncement adds:

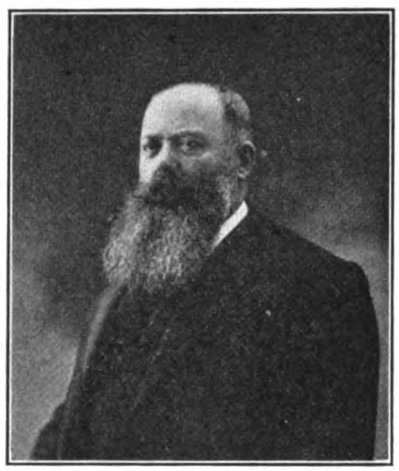
"Another important feature of this jack is its range of use. Although occupying no more room in a tool box than any other jack, the Hi-Lo Jack will start to lift its load at six inches and will raise it to a height of 17 inches. This is an invaluable advantage to the man driving a car or truck of underslung suspension, or one of low clearance. This feature also obviates the necessity of carrying two jacks in order to lift a car mired in the mud to within six inches of the ground; one jack to lift the car from the spring to a height sufficient to admit the other under the axle. Any driver who has had an experience of this kind will at once appreciate the value of a jack that starts to lift at six inches and lifts with ever increasing power until the limit of 17 inches is reached.

"Another advantage of Hi-Lo Jacks is the long handle, which is an integral part of the jack. The length of the handle gives greater leverage and allows even the heaviest loads to be raised with a minimum of effort. A frail woman finds her strength ample to lift a heavy touring car. The fact that the handle is attached firmly to the jack makes the placing of the jack directly under the axle a simple and a clean operation. This feature will be specially appreciated by the owner and driver of a pleasure car. No longer will it be necessary to get on one's knees on a dusty road in order properly to place a jack.

"Hi-Lo Jacks are now being manufactured and sold only by the Rowe Calk and Chain Co. of Plantsville, Conn. They are made in six different sizes and are so constructed that each jack has a large margin of safety over and above the load that it is supposed to lift. They are made of a combination of drop forgings, fine grade malleable castings and cold rolled steel, according to the high standard of the other products of this company. The Hi-Lo Jack is protected by a very full guarantee backed by the Rowe Calk and Chain Co. The application of the toggle joint principle to a jack is covered by patents so wide that no other jack of similar construction can be made."

BERGOUGNAN BUYS EQUIPPED TIRE FACTORY IN TRENTON.

With the 5,000,000 mark in automobile registration passed and the American market for tires growing every day, European tire manufacturers are turning from a consideration of their prospects



Raymond Bergougnan.

in the countries lately devastated by war to the larger opportunities offered here.

One of the largest, if not the largest, tire concerns in France, the Etablissements Bergougnan of Clermont-Ferrand, has taken the initiative and during the current month has consummated the purchase of a modern fully equipped tire factory in Trenton, N. J., where from now on the justly famous Bergougnan tires will be manufactured.

The Bergougnan company has a record that is as old as the automobile tire industry. Before the pneumatic tire's advent it was engaged in the manufacture of rubber stamps and other incidentals, but its real history begins in 1889 when tires first made their appearance on the roads of France. From a capitalization of 1,500,000 francs it has grown to a monster organization, with branches in every civilized country on the globe.

The founder of the business, Raymond Bergougnan, is one of the most progressive of the "captains of industry" of France. During the war he took in hand the supply of tires for the transport division of the French army, and it was in a great measure due to him that communication was kept open between Verdun and the supply depots in the rear. Night and day thousands of army trucks brought ammunition and fresh troops to hard pressed Verdun, and more than two-thirds of these trucks were mounted on Bergougnan tires. Mr. Bergougnan is an officer of the Legion of Honor, and is as active in the management of the Bergougnan establishment as on the first day of its organization.

In addition to the plant in Clermont-Ferrand, which covers 40 acres and employs 6000 workmen, the Bergougnan company operates factories in Moscow, Russia and Turin, Italy. The new Trenton factory is equipped to turn out 600 tires a day, but extensive additions are planned in order to permit the manufacture of solid tires, in which branch of the industry the Bergougnan firm enjoys supremacy.

Some idea of the importance of the concern and of the solicitude which it feels for the welfare of its employees, may be gathered from the fact that throughout the war it carried on the pay roll at half pay more than 800 of its men serving at the front and contributed 2,407,075 francs to the relief of their dependents and in various charities and welfare work.

A vigorous advertising campaign is being planned.

NEW YORK COIL CO.'S FINE LINE OF REPLACEMENT COILS.

Attention is called to the advertisement of the New York Coil Co.'s line of replacement coils appearing elsewhere in this issue. The New York Coil Co., one of the oldest manufacturers of ignition coils for all purposes, offers a line of replacement coils designed to be installed instantly without machine work of any nature on any make or model of car. These coils are carefully designed to fit and work properly in conjunction with the particular type of ignition system supplied on each model.

The windings, condensers and resistance units, it is claimed, are so proportioned that an extremely powerful spark is delivered under all operating conditions, and garagemen find that they are a solution to ignition coil problems.

New York Coils, the coil maker claims, invariably show a big improvement on any car upon which they are installed, and it is pointed out that by stocking a small quantity of coils suited to the cars upon which each particular repairman specializes, delay of securing proper coil is avoided and the repairman is enabled to give the customer prompt and efficient service.

A chart showing the proper coil to order for each car with other valuable information will be mailed to all readers of this publication who address the New York Coil Co., 338 Pearl street, New York City.



New York Coils.

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How To Overhaul Car Before Starting On Tour

Usually Considerable Work Has to Be Done If Motorist Would Avoid Trouble on Trip

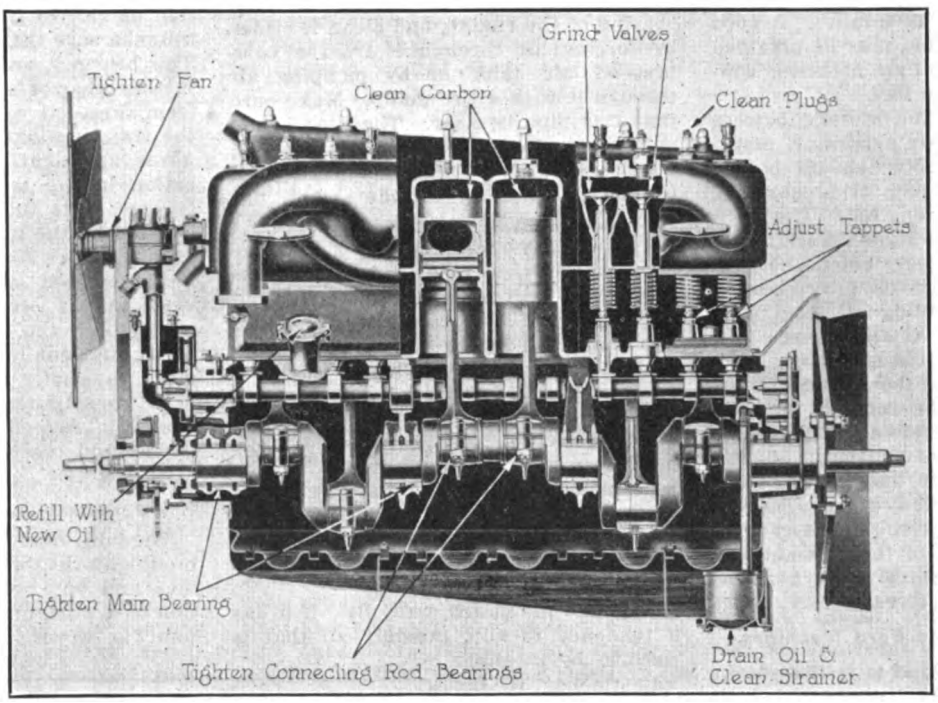
THE time given to putting an automobile in good operative condition before starting a tour of considerable length is well spent. Invariably there will be considerable work to be done about a car and its power plant if one is to be certain that a touring trip will have its fullest pleasures. If the car has been used to some extent its condition will be better understood. If a new car the engine may be at that point where it is running its best. No one should take a new car from the salesroom floor and start on a trip of any length. The engine should be thoroughly limbered by service. If one is to use a car that has been driven considerably there is every reason for going over it.

If a new car, the cooling system, no doubt, will be in first class condition and it will not be necessary to spend much time on it. If the car has had more or less of service it will be well to wash out the system with a solution of washing soda and hot water, using about a half pound of common washing soda to every four gallons of water. The radiator should be drained and the solution poured into the radiator and allowed to stand. If you believe there is considerable rust in the system, drive the car for a few hours or a day, allowing the heated solution to dissolve the rust and sediment. The following day drain out the solution, rinse with clear, fresh water several times and finally fill the system with clean water. This will usually be sufficient unless there are leaks in the radiator, in which event it should be repaired by one expert in repairing radiators. Such men will do a job they are willing to guarantee.

Examination of the Engine.

The engine should receive very careful attention, as upon it more than upon any unit of the car the pleasure of the tour depends. If a new car but little actual labor is needed except to see that the valves work properly, the carburetor is properly set, the points in the breaker box are clean and adjusted and the engine is oiled and greased. If the car has been used more or less the carbon should be removed and the valves ground. This work may either be done at home if the owner wishes to do it, or the car may be taken to a repair shop.

At the same time the bearings should receive attention. If loose or worn they should be tightened or replaced with new. This applies to the main and connecting rod bearings. The pistons and rings and the wristpins and their bushings should be examined and cleaned. If rings are broken they should be replaced.



Parts Needing Attention on a Six-Cylinder Engine Before Attempting a Tour.

If scored cylinders are found they should be treated either by a patented filling process or else rebored and oversize pistons fitted. Wristpins loose in their bushings may be restored by fitting new bushings.

If the engine is a separable head type it will be well to examine the gasket beneath the cylinder head. If it is frayed or may leak it should be replaced. Examine the gaskets under the exhaust and intake manifolds for leaks. If they show weakness, renew them. If the gaskets are in good condition tighten the nuts that hold them in place, doing this work when the engine is hot as it is more certain than if the engine is cold.

Try all nuts about the engine for looseness, especially those that secure it to the frame. Be sure the engine has plenty of oil. An extra good grade of oil is best insurance against repair bills. Buy the best oil possible to obtain and use plenty of it. Plenty of oil is necessary just after the bearings have been adjusted.

The push rods will need adjusting after grinding the valves as the valve seats may be so low that the valves are held open. This adjustment is best made while the engine is warm.

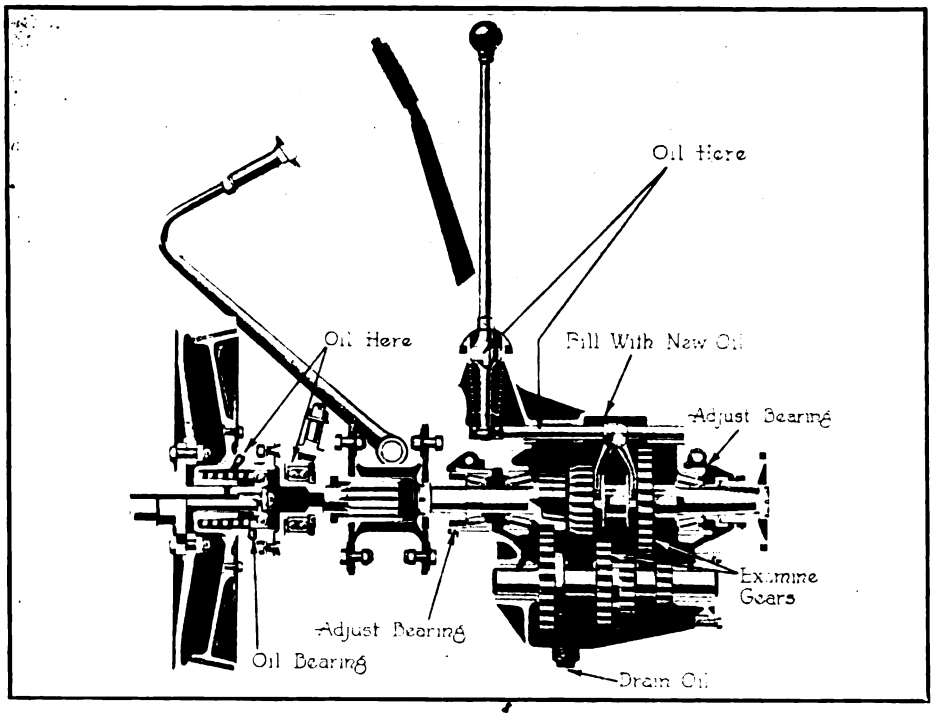
The carburetor should be checked for any possible errors in adjustments and if errors are found take the car to a good carburetor expert. A warm engine is necessary for a good carburetor setting. Never try adjusting a carburetor while the engine is cold.

The carburetor should be so adjusted it will not require further attention, and should be regulated for the section of country through which tour is to be made. A cold air such as is found in mountainous country will require more gas at the needle than will the air of a country that is fairly level and the temperature is more normal.

The condition of the starting and lighting system should be carefully checked. The brushes should be examined and if worn too badly should be replaced. The commutator may be smoothed or, if covered with gum or oil, brightened with a strip of sandpaper held in place by a short piece of wood. The sand should be blown out after the work is completed. Oil soaked wires had best be replaced as such wiring may be the cause of many ignition defects. The timer should be examined and cleaned. This may be done with gasoline and a cloth or brush, making sure that all the gasoline has evaporated before replacing the cover. Many a fire has been caused by failure to dissipate gas put into a timer for cleaning it.

The generator and starter bearings should be oiled, which will usually suf-

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Examine Clutch and Transmission Carefully at Points Indicated.

fice for from 1500 to 2000 miles. A good grade of oil is best and may be obtained from any store handling firearms, sewing machines and the like.

The wiring from the storage battery to the switch, starter, generator, motor cutout, horn lights, etc., should be examined for short circuits or breaks and, if these are found, repaired. The horn and lights should be in good working order. The storage battery should be tested with a hydrometer. A fully charged battery shows a reading of about 1285 specific gravity, but if the charge will not turn the starter it may show a reading of about 1225. If the reading is low the battery should be removed and recharged from an outside source. At the low reading the lights will burn, but the starter will not turn the engine. The battery may also be tested as to its general condition and for the depth of sediment at the bottoms of the jars and the condition of the electrolyte by an experienced battery repairer.

Special Attention to Ford Machines.

If the car is a Ford it is well to drain the oil from the magneto case and flush it with kerosene. Remove the transmission cover to facilitate the work and replace the cover after the kerosene has been placed in the base. Turning the engine by hand for several minutes will remove all sediment on the sides of the base and particles of metal that may be on the faces of the magnets. Drain out the kerosene and refill the case with clean oil to the level shown on the gauge on the side of the magneto case. If by chance the engine supports are broken or cracked, either have them welded or purchase temporary brackets that may be used in case of a break. These may be purchased from any supply house.

Have a competent mechanic disconnect and take out the oil feed pipe that runs the length of the engine base, from a point over the flywheel to the front bearing of the engine, and clean it either by forcing air through it from a compressed air tank or by pumping air through it with a tire pump. Make sure that this pipe is clear. The pipe is the only means for supplying oil to the timing gears, main bearings, connecting rod bearings, wristpins, cylinders and pistons.

The writer noticed recently a Ford engine where this pipe had become so filled with sediment that oil could not possibly flow. The result was that the two front cylinders were so badly scored that the owner decided that it would be more economical to install a new engine block.

This pipe may also be cleaned while in the engine by simply removing the base plate of the engine and forcing air through the pipe without taking it out. In fact, this is the usual method in Ford shops where the better class of work is done.

Examine the clutch carefully. If it has a tendency to slip, possibly all that is needed is a slight adjustment. If the lining is badly worn no adjustment will restore it. In such a case, if the clutch is a cone type, reline it, being sure that the rivet heads are well down into the facing so that they will not prevent the clutch holding. If the clutch is a disc type and slips, adjustment may be made by tightening the nuts on the bolts on the front of the clutch. These may be located in the spokes of clutch and are fairly easy to reach. Be sure that you tighten each an equal number of turns, otherwise clutch will not engage evenly and will wear unnecessarily. The disc clutch usually requires very little lubrication, which is supplied mostly at the bearings by means of grease cups. If oil is used, be careful not to get any on the faces of the discs, for oil will cause a clutch to slip.

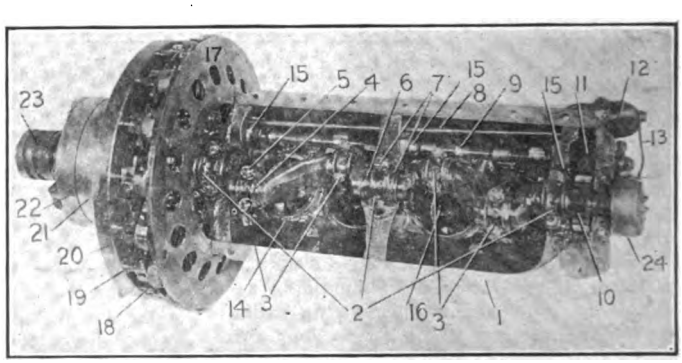
If the clutch is a cone type and engages harshly, this can be improved by softening the leather facing. Neatsfoot oil is best, but if not obtainable ordinary engine oil may be used. Hold out the clutch pedal and squirt a small quantity upon the leather and turn the clutch by hand until the face has been covered evenly. In Ford cars the high and reverse bands if worn badly should be replaced. The high speed clutch should be tested and if needed should be adjusted. This adjustment is made at the rear of the transmission gearset with the three finger arms. Turning the adjusting screws in will tighten the high speed clutch and turning them out will loosen it.

Transmission Must Be Lubricated.

The transmission rarely needs attention outside of lubrication, but it is well to make sure that it is in good condition. The bearings and stuffing boxes or adjusting sleeves should be examined, as from these oil will at times work out of the transmission case. Make sure these boxes are tight. Have sufficient lubrication in the transmission case. That is, that it is full to the height recommended by the manufacturer, which will usually suffice for 1500 to 2000 miles. A good grade of steam cylinder oil is advised and is preferred to grease, as it will follow the gears better and give them sufficient lubrication. This applies more especially to all types of sliding gear transmissions. The Ford transmission is lubricated by the same oil as the engine and receives its supply from the same source.

Universal Joints May Be Worn.

The universal joints are usually covered with leather boots or steel housings and one not familiar with the action of a worn universal may not know a joint is worn. A repairer can get a



1, Cylinder Block Flange; 2, Main Bearings; 3, Connecting Rod Bearings; 4, Connecting Rod Cap; 5, Connecting Rod Cap Bolts; 6, Main Bearing Caps; 7, Main Bearing Cap Bolts; 8, Oil Tube; 9, Camshaft; 10, Crankshaft Timing Gear; 11, Camshaft Timing Gear; 12, Breather or Filler; 13. Timer C se Clamp; 14, Piston; 15, Camshaft Bearings; 16, Wristpin; 17, Magneto Field; 18, Magneto Field Coils; 19, Magneto Magnets; 20, Flywheel; 21, Slow Speed Drum; 22, Brake Drums; 23, Clutch Spring; 24, Engine Starter Drum.

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rough idea of the wear by turning the shaft as far as it will go by hand and reversing the motion. If there should be any appreciable play the joint had best be taken apart and new parts put in or else rebushed. After fitting the leather or steel jacket fill it with cup grease. Or, if cup fed, fill the compression cup and screw it down two or three times so that the grease may reach every part of the joint.

Differentials and Rear Axles.

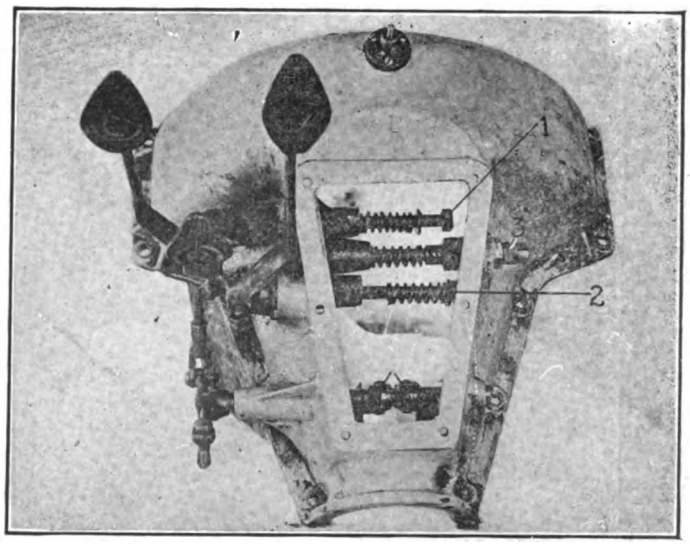
The differential gearset should be examined for broken teeth in the large bevel gear or in the pinion. If teeth are broken the gear or pinion should be removed and new installed. If the teeth are chipped at the corners the gears should be removed and the rough edges ground off on a carborundum stone. The gears can then be replaced and fastened securely with either hot or cold rivets. Hot rivets are decidedly the better, but cold rivets have been used by repairers with good results. The old grease should be removed and the case filled with fresh grease. Steam cylinder oil is the best lubricant to use for the differential gearset, as it clings to the faces of the gears and thoroughly lubricates them and the bearings at the side of the differential housing.

The bevel ring gear should be examined and adjusted if the gear and pinion do not mesh properly. This may be done on most differentials by an adjustment at one side, forcing the bevel gear either closer in mesh with the pinion or farther away from it.

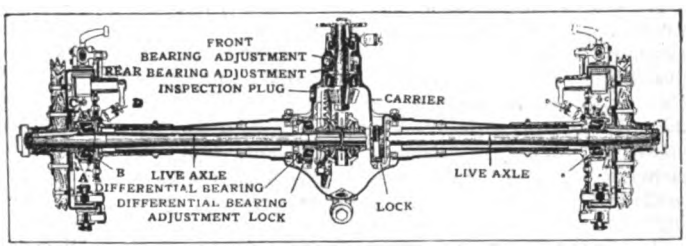
Attention should be given the axles. If the wheels do not run true or the spindles are sprung, it is best to supply new axle shafts. Examine the bearings at each end of the rear axle and be sure that they are in good condition and are not excessively worn. Be sure that lubrication is supplied them. See that the castellated nuts that secure the wheels to the rear axle shafts are seated tightly and the cotter pins are in place if the axle is a semi-floating type. If either three-quarter or full-floating type, see that the bearings on the axle housing are sufficiently lubricated and the wheels are securely fastened to the axle shaft by the nuts and bolts that extend through the hub of the wheel, or by the plates retaining the bearings.

It is very essential that the brakes should be in the best condition and they should be critically examined. Examine the service brake, first by noting the thickness of the lining. If worn thin reline the shoes as this brake will do most of the work. After relining they are to be adjusted. Jack both rear wheels and block the front wheels so the car cannot roll ahead. Have a second person set in the driver's seat and work the brake while you make adjustment with the turnbuckles on the pull rods under the car. When finished the brakes should pull even, locking both wheels when the pedal is about half depressed.

If the emergency brake needs relining make this restoration. Adjust it in the same manner as the service brake, making sure that the wheels lock when the lever is pulled about half way. If one is to tour in the mountains good brakes are a necessity and it is well to try them daily when on the tour and if necessary set them so they will always be in condition to use.



1, Reverse Adjusting Nut; 2, Brake Adjusting Nut; 3, Slow Speed Adjusting Nut.



Examine Rear System Carefully at Points Indicated.

Chassis Inspection.

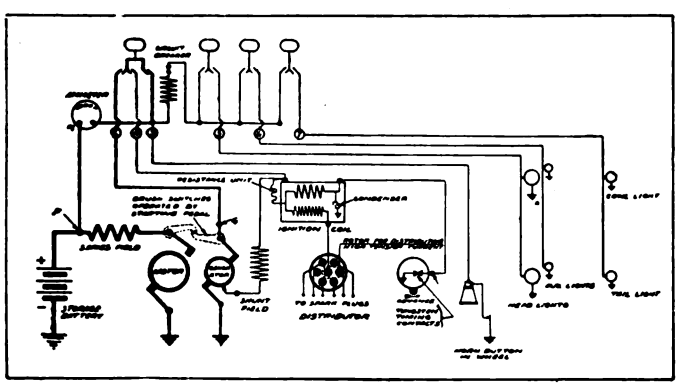
Look over the chassis carefully and tighten all loose nuts. Some will have worked loose. See that all castellated nuts are fitted with cotter pins of the right size and bent so that they will not slip out. Note whether the frame is cracked or bent and, if so, have it repaired. Fill the spring grease cups and make sure that the grease enters the spring bearings. See that all spring shackles are tightened and cotter pinned. Examine all grease cups and see that they are filled and turned down daily. This applies to all slow moving bearings and is very essential. All pinhole oilers should receive a few drops of oil daily, but not so much that the oil will flow outside.

Be sure the steering gear is adjusted and lubricated. Examine the ball joints at each end of the drag link at the end of the steering arm and the tie rod. Notice whether these are worn out of round and if worn either renew or grind them round. Then tighten them securely in place and lubricate them. Examine the tie rod that connects the steering spindle arms of the front wheels. See that the joints have plenty of lubrication and are not worn too badly. There are various ways of taking up lost motion at these points, but probably the better and most satisfactory way is to put in new parts.

It is a good idea to check the alignment of the wheels and more especially the front wheels. It is not a long process and may mean a considerable difference in the wear of the front tire casings. There are two methods of doing this and that most used in garages is a heavy string or cord long enough to reach from the front to the back of the car. Place a weight, either a nut or bolt, securely fastened, at one end of the string and slip it through the spokes of the rear wheel. Pass it around the rim about half way from the floor to the hub of the wheel. Draw the string tight against the front edge of the tire of the front wheel. Turn the wheel till the spring bears evenly against both sides of the tire. Change the string to the other side of the car and repeat the process, but without changing the front wheel. One can see whether the wheel is in or out of alignment by the bearing of string against the sides of the front wheel. One may purchase aligning equipment that will possibly do this more accurately. Several are now in the market.

Tire Casings and Tubes.

If you have a car that is new or nearly new, the tires and tubes will probably be in good condition. But if the car has been used considerably the casings will be worn. The shoes should be examined for cuts, abrasions, stone bruises, sand blisters and the like. If found they may be repaired either by vulcanizing or by



Wiring Diagram of Delco System of Starting and Lighting.

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treatment with some one of the various equipments or preparations sold by accessory supply houses.

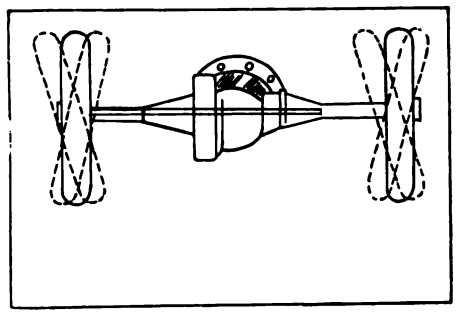
If the casings are badly worn it will be best to purchase one or more new shoes and carry them in tire holders on the car. You may be far away from a garage or service station where casings may be purchased and have a tire fail. Run the old casings till they blow out or are no longer serviceable and then replace them with the new shoes and in that way get all the mileage that they will give.

Tubes are always necessary and two or three should be carried in the car, either in the boxes in which they are purchased or specially made bags. The bags keep them from chafing and protect them from oil. Tubes should be packed folded standing on edge and sprinkled with talc powder, to prevent them chafing. Do not let them come in contact with greasy rags or loose tools.

Extras Desirable for Touring.

The motorist intending to make a trip of considerable length, and possibly leave the beaten paths of travel, will do well to carry a small supply of extras with him such as a set of extra plugs. Possibly the engine requires a plug of special make and by having a set with you you will be insured against inconvenience. Make sure the tool kit is complete, that you have sufficient wrenches, tire tools, jacks, pumps, etc.; that the tire and tube kit includes a small vulcanizer, patching rubber and cement, patches and the necessary abrasive for roughening the rubber.

Purchase covers for the spare shoes if you have none, as bright sunlight will damage casings quickly. Carry an extra supply of oil in a gallon can. It will be handy in case of emergency or if you cannot purchase the oil you have used. It is good judgment to have a gallon can of gasoline for emergencies. It may serve you well when vulcanizing a patch to a tube, as it saves getting gasoline from the main tank. A small can of cup grease, a supply of clean waste and a



Result of Bent Axles Showing Excessive Wear on Rear Tires.

can of roadside cleaner for washing the hands will also be very useful.

A tool box sufficiently large for all the necessary tools and extras should be placed on a running board, with a carrier ample for the luggage of the party. These may be purchased at slight expense, add to the appearance of the car and are great conveniences.

There are articles innumerable that may be purchased by the motorist intending to tour, among which is the auto tent, auto camp stove, collapsible boat, fishing table, prepared and canned food of various sorts, etc. Such articles may be carried either in the tool box or stored in a special box fastened to the rear of the car. Most of the automobile tents suitable for auto trips are made in such a manner that it is unnecessary to carry tent poles, such poles as are required being cut at the camping site and the tent being erected in such a manner that use is made of one side of the automobile. Again one may use a trailer attached to the rear of the automobile by a short pole that will carry whatever tenting supplies, cooking utensils, stove, etc., as are required for the trip. Some trailers are manufactured on a very elaborate scale, having sides that open and form beds, and a tent covering that covers the trailer as a whole. The trailer is used at night for sleeping quarters and during the day carries the tent and supplies to the next camping site.

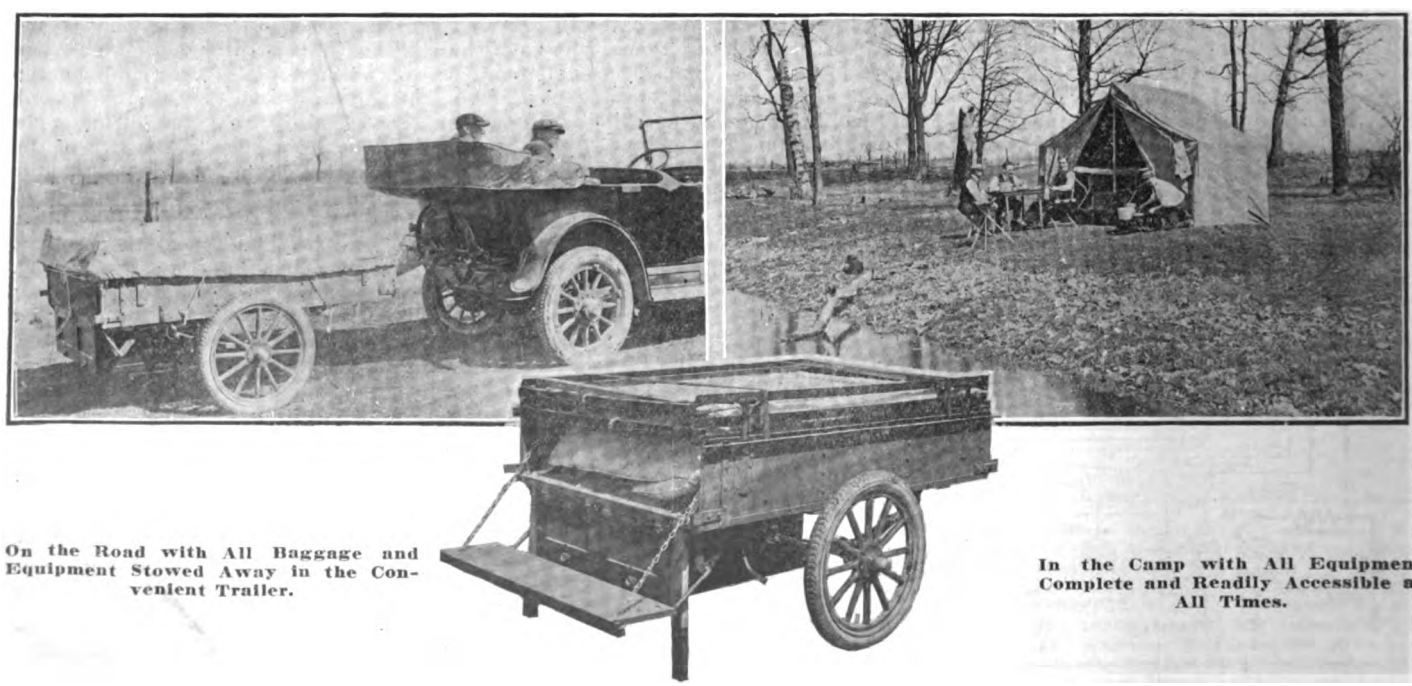
Fresh supplies, such as milk, eggs and vegetables may be purchased from farmers along the route and other supplies may be purchased from storekeepers in the towns or cities through which you pass, so that one may live out of doors from the start to the finish of a trip without having to stop at hotels. Many motorists enjoy their vacation trips in this manner, returning refreshed both in mind and body by the healthy outdoor life.

Remember that morning and evening, in high altitudes especially, or stormy days, call for added wraps. Carry sweaters, raincoats and rubbers. It might be necessary to change tires in rain and mud, if nothing else.

Because of the multitude of cars on main highways, more comfort and less dust would be had by planning a trip off beaten paths, for there are plenty of good, or at least fair, roads not mentioned in the average tour suggestion. They are shown in the guide books, and one may prefer less company and more opportunity to enjoy nature at her best.

Above all do not plan a trip which calls for top speed to make the stops. Rushing around to get somewhere for lunch so there will be time to get to some other place to sleep is too much like a race. Allow lots of time, and if you get ahead of schedule hunt out beauty spots for a visit. Between Port Jervis and Delaware Water Gap there are four or five side trips to charming waterfalls and spots where folks rave over nature's handiwork. Almost none of the tourists passing over the fine state road ever see the real beauties of the trip, being in a hurry to get somewhere for a good meal. In a land where every hotel is good the leisurely tourist misses no gastronomical delight and gets all the other delights.

Summed up, the requirements of the perfect tour are working knowledge of your car, equipment for quick repairs or adjustments and time to enjoy yourself.



On the Road with All Baggage and Equipment Stowed Away in the Convenient Trailer.

In the Camp with All Equipment Complete and Readily Accessible at All Times.

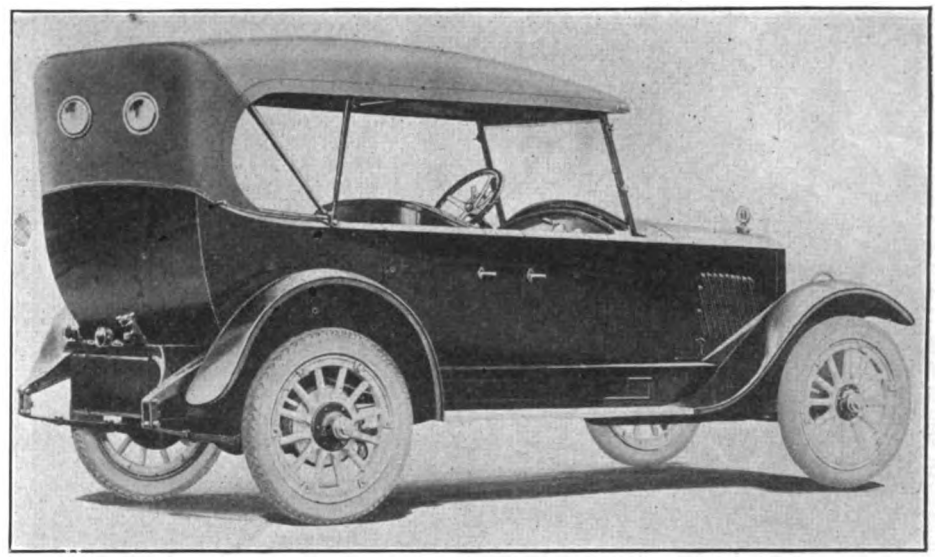
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ALLEN 43 HAS MARKED IMPROVEMENTS

WITH the news, recently published, of Allen Motor Co.'s move from Fostoria to Columbus, O., where a big plant was equipped for large production, there have come many queries as to the type of car to be manufactured.

The new Allen model, a five-passenger touring, known as series 43, is in no sense a continuation of past Allen models. Practically every detail of the car, from the motor and transmission built in this company's own shops to the body and general lines, has been radically changed.

The motor is an economical "four" of 3½-inch bore and five-inch stroke, but with three bearing crankshaft instead of two, and with a "superheated" intake, which latter feature probably accounts for a grade of performance that is extremely unusual. The superheating of the gases gives greatly increased efficiency. It gives economy and develops exceptional power.



Three-Quarter Rear View of Allen 43 Touring Car.

A fully equipped Allen touring car with normal load gave the following results in factory tests: A car speed of better than 60 miles an hour; the ability to accelerate from standstill to 40 miles an hour in 20 seconds and to 58 miles an hour in 52 seconds. The car went over the Uniontown Hill in Pennsylvania at 31 miles an hour, which must be recognized as a remarkable performance since the car that can negotiate this hill "on high" at any speed is rare and many of America's best hill climbing cars have never made a record as good on this hill.

But more to the point is the nicety of engine design which gives maximum torque, which means pulling power and economy, at all car speeds between 12 and 36 miles an hour.

The Allen engineers state that they could raise the pulling power at high speed, were it desirable to do so, but to maintain highest efficiency and hold it at all normal driving speeds is the ideal condition and one that has been attained in this car.

Notwithstanding the exceptional performance this Allen is not over powered as might at first be imagined. It is simply a case of building a motor whose efficiency is beyond that formerly considered possible. This new Allen shows that the war period was not wasted from an engineering standpoint. While production was down the designers were busy preparing a finer type of light car.

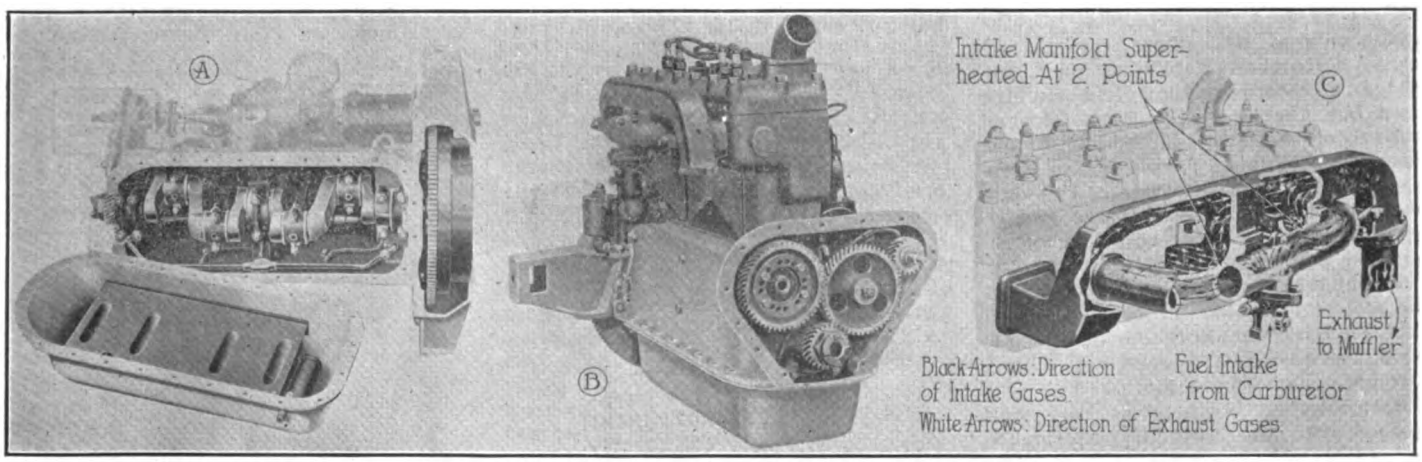
The illustration of this car shows its good looks. The lines are new and in accord with the best advances in body design noted in other quarters.

The maker claims for this car a riding ease that is attained without resorting to lengthy wheelbase. The rear springs, for instance, are said to be the longest in proportion to wheelbase. Because the springs are nearly flat they obviate rebound and the car rides very smoothly even at high speeds.

The frame is unusually deep and rigid. The maker claims to have overcome entirely what in the past has been a prevailing fault, that is, making the body stiffen the frame. This Allen frame is so stout that it stiffens the body rather and does away with body creaks and sticking doors which are always a direct result of using a semi-flexible frame.

Mention of a few of the mechanical units and equipment may serve to indicate some of the high points in design: Pressure system of lubrication in the motor; oil cups instead of grease cups on spring shackles; 10-inch dry disc clutch; transmission in unit with the motor with speedometer drive from the rear end of the main transmission shaft; Auto-Lite two-unit starting and lighting; Connecticut ignition system; thermo-syphon cooling with ample water jackets around valves as well as cylinders; worm and full gear for steering; pressed steel housed rear axle of full floating type; full Hotchkiss drive with two Detroit ball bearing universals which are made to hold their lubrication instead of throwing it off; Stewart vacuum fuel feed; 32x4-inch tires; one-man top with plate glass rear windows; full crowned fenders and aluminum covered running boards.

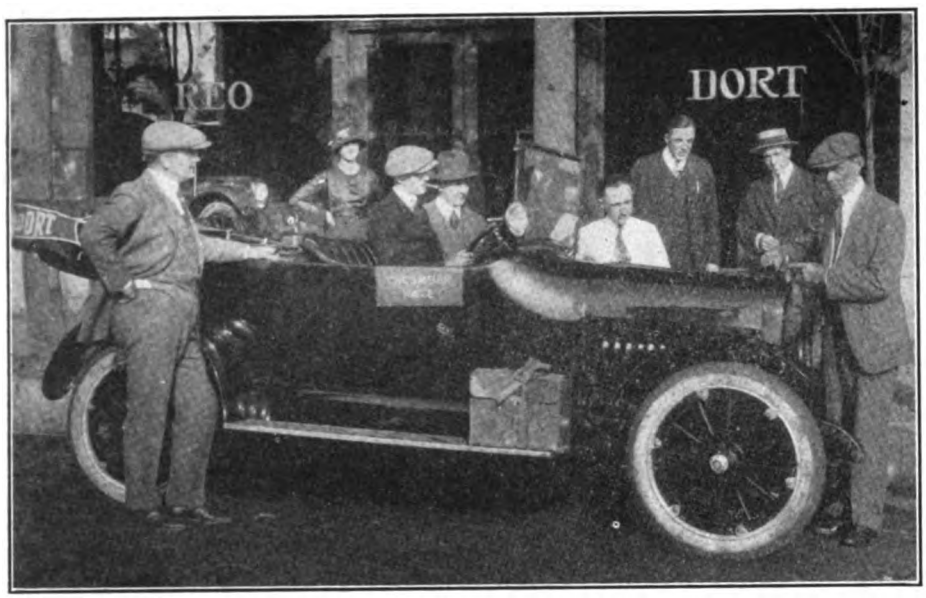
The car ready for shipment, weighs approximately 2580 pounds and is finished in dark blue and black. The Allen Motor Co. reports an unusually heavy car demand from dealers and distributors.



A, Crankcase with Oil Pan Removed; B, Showing Timing Gears; C, Superheated Intake.

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"CUCUMBER KATE" MAKES FINE RECORD AS SCOUT CAR



Dort Touring Car Known as "Cucumber Kate."

TOTALING 4000 miles in a month, "Cucumber Kate," the Dort touring car used by Earle C. Anthony, Dort distributor for California, as a scout car, has hung up an enviable record on the coast. The first official contest in which this Dort entered was the Stockton-Yosemite Reliability Run, through the steep Chowchilla mountain district into the heart of the Yosemite valley.

The going was very severe in places, especially the mountain passes and through the desert tracts where for nine miles the car had to run on low gear, but despite this the water in the radiator was always at summer heat, as shown by the motometer. Here the Dort defeated all cars below $1200 in price and was awarded first place in its class. It was on this run that the name "Cucumber Kate," was applied, because the motor was always cool as a cucumber.

A few days later the Dort entered the Economy Run from Los Angeles to Yosemite and for the 375 miles averaged 24.3 miles to the gallon. This was in company with an A. A. A. observer with hood and motor sealed, and gasoline only being taken on at certain places along the way.

Not content with these various records, "Cucumber Kate" has just completed a record-breaking trip, running from Los Angeles to San Francisco and return in 34 hours elapsed time, four hours of which were passed to San Francisco and Oakland. Outside of this only one stop was made for a tire change when a lot of loose rock on a turn in the highway punctured one of the casings.

The new Dort record beats the time of the fastest trains on the coast, the Owl and the Lark, Southern Pacific specials plying between Los Angeles and Frisco, by one hour and one minute.

Naturally, Mr Anthony is very well pleased with the splendid performance of his car, and the Dort manufacturer is also happy over the record.

Pointers on Adjustment of Carburetors

WHEN touring, especially in the mountains, it occasionally becomes necessary because of changes in climatic conditions, for the motorist to adjust his carburetor. This is a delicate operation and one which easily may result in more trouble than good unless it is done properly.

The Beneke & Kropf Manufacturing Co., maker of Rayfield carburetors, has issued a few simple instructions on carburetor adjusting which will prove of great assistance to the tourist. The instructions follow:

"Before a Rayfield carburetor leaves the factory the float level is correctly set and should never be changed. If the carburetor does not give the desired results the motorist should write the factory or get in touch with the nearest service station.

"On the Rayfield water jacketed carburetor, model G, there is no air valve adjustment and only two gasoline adjustments, one for low speed and one for high speed. In making these adjustments it is important to remember that both are turned to the right for a richer mixture.

"Before adjusting the carburetor the motorist should be sure that there are no obstructions in the gasoline line, that the manifold connections are absolutely tight and free from air leaks, that the valves and ignition are properly timed and that there is a hot spark and good compression in all the cylinders.

"Carburetor adjustments should always be made with the dash control down and the low speed adjustment should be made before regulating the high speed.

"In adjusting the low speed on model G proceed as follows:

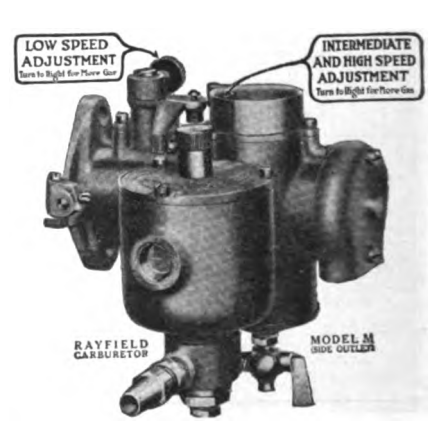
"With throttle closed and dash control down, close nozzle needle by turning low speed adjustment to the left until the block slightly leaves contact with the cam. Then turn to the right about three complete turns. Open throttle not more than one-eighth. Prime carburetor by pulling steadily a few seconds on the priming lever. Start motor and allow it to run until warmed up. Then with retarded spark close throttle until motor runs slowly without stopping. Now, with motor thoroughly warm, make final low speed adjustment by turning low speed screw to left until motor slows down and then turn to the right a notch at a time, until motor idles smoothly. If motor does not throttle low enough, turn the stop arm screw to the left until it runs at the lowest number of revolutions desired.

"In adjusting the high speed advance spark about one-quarter. Open throttle rather quickly. Should motor back-fire it indicates a lean mixture. Correct this by turning the high speed adjusting screw to the right about one notch at a time until the throttle can be opened quickly without back-firing.

"If loading (choking) is experienced when running under heavy load with throttle wide open, it indicates too rich a mixture. This can be overcome by turning high speed adjustment to the left.

"Adjustments made for high speed will in no way affect low speed. Low speed adjustments must not be used to get a correct mixture at high speed. The adjustment of the Rayfield cannot





Illustrations Indicate Proper Way to Make Adjustments.

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change. Both adjustments are positively locked.

"The Rayfield side outlet carburetor, model M, also has two adjustments, one for low speed and one for intermediate and high speeds. A locking device holds the adjustments absolutely in place once they are made.

"The low speed adjustment on model M should be turned to the right or left as required until motor runs properly at low speed. Allow motor to become thoroughly heated, then make final adjustment by turning low speed screw to the left until motor slows down; then turn to the right a notch at a time until the motor idles smoothly. If motor does not throttle low enough, turn stop arm to the left until it runs at the lowest number of revolutions desired.

"The high and intermediate speed adjustment is made accessible by removing the hot air elbow from over the main air valve. Do not move the high speed screw more than one-eighth turn at a time. Turn it to the right for a richer and to the left for a leaner mixture. This setting, being very effective, will greatly determine the fuel economy; therefore, make sure it is set as lean as possible, still retaining good acceleration.

"On any model the Rayfield dash control, when properly used, will render easy starting, furnish a richer mixture when the motor is cold, and maintain a correct mixture under the most extreme atmospheric changes. To start the motor when cold first close the throttle and pull the dash control all the way up. Then, when the motor starts, open the throttle slightly and push the dash control one-quarter of the way down. As the motor warms up push the control gradually as required. When thoroughly warm push the control all the way down. When the motor is warm it is necessary to pull the dash control only part way up for starting.

"In more than 1000 Rayfield service stations all over the country skilled mechanics are ready to give expert advice to tourists. If carburetor trouble develops it is generally better to have it corrected at one of these stations, rather than to attempt to change it without advice."

Webber Carburetor Has Become Favorite

THE Webber carburetor has gained wide popularity because of the satisfaction it has given to its great army of owners. It is made by the Webber Manufacturing Co., 66 Stanhope street, Boston, which has always taken pride in the high quality of its products.

The model E carburetor is made to give splendid service. The high standard of workmanship necessary in an instrument of this grade is strictly maintained and only materials which are the very best for the duty which they perform are used in this instrument.

As the useful life of a carburetor depends largely on the materials used in its construction, in the Webber the float valve seat is made of monel metal, a very tough, close grain and non-corrosive metal, ideal for this purpose, but difficult and costly to machine.

The float valve is also made of monel metal and is fastened universally in the float valve thimble, so there can be no tendency to wear either valve or valve seat out of round, and consequently they never leak. The float is of spun copper, annular in shape and so designed that all seams are always above the fuel level. Each float is twice tested before assembling.

The air valve is of aluminum and very light, so air valve inertia is reduced to the minimum. All wearing parts which could affect the adjustments are of hardened steel, to give long and hard service without showing signs of wear. All other wearing parts are of high grade bronze bearing metal.

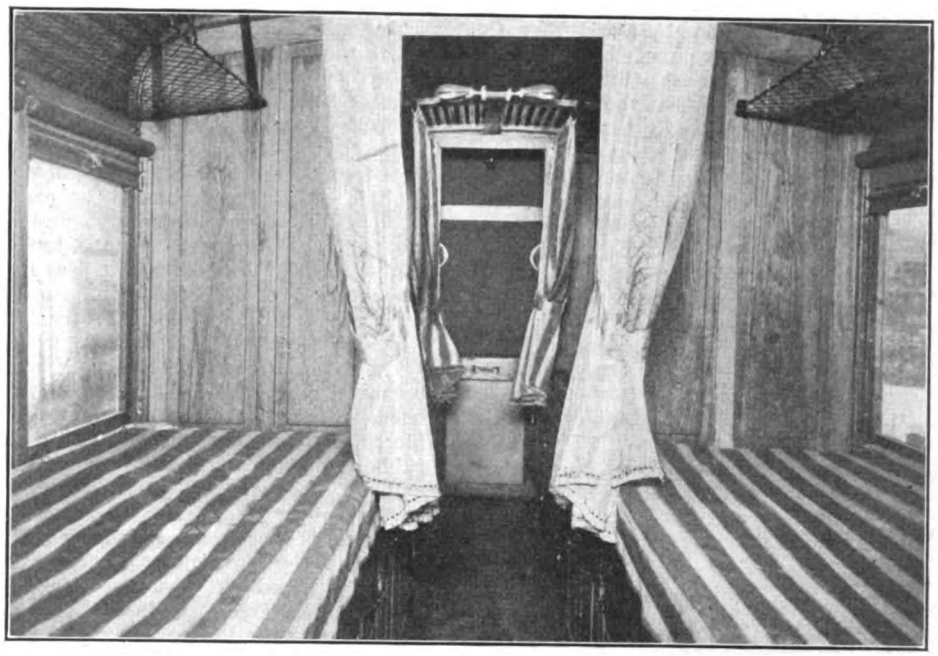
With the Webber the engine starts easily in any weather without the aid of auxiliary priming devices because, in starting, the fuel orifice is greatly enlarged, but the air passage is not restricted, this allowing the air stream to pick up sufficient fuel and carry it to the cylinders.

Real economy and numerous other features also mark this highly dependable carburetor. The instrument is easily adjusted. An interesting feature is that test made by the company has shown that altitude has so little effect upon the Webber that adjustments carefully made at the seashore cannot be improved upon in the mountains.

Webber carburetor distributors include the following:

Jones Auto Supply Co., Oakland, Cal.; W. S. Smith, Denver, Col.; B. K. Sweeney, Denver, Col.; Motor Inn Garage, Davenport, Ia.; H. H. Van Vechten, Albany, N. Y.; J. Lawrence Hill, Rochester, N. Y.; P. J. Shields, Syracuse, N. Y.; Webber Sale Co., 146 W. 56th street, New York City; Shields Garage, New Hampshire; Johnson Bros., Springfield.

MOTOR TRUCK TRANSFORMED INTO "HOTEL ON WHEELS"



"Hotel on Wheels."

THE accompanying picture shows the interior of a motor truck called the "Hotel on Wheels," which is conveying C. G. Barley, president of the Indiana Truck Corporation; Mrs. Barley and Mr. and Mrs. Harry Goldthait of Marion, Ind., on a round trip from Marion to California, a total of 4000 miles.

It is complete to the last detail. There are sleeping compartments for four persons, with glass windows that can be raised and lowered in the side of the body. Beneath each sleeping compartment is a commodious chest for clothing. At the rear of the body is a complete kitchen equipment.

The rear is also equipped with a motorcycle for special errands that may take the driver of the truck off the main line of travel. A complete Delco lighting system, which furnishes 25 electric lights, is utilized, with batteries, generator and motor. Compartments on the outside of the truck contain tools, ropes and various other equipment that is likely to be needed.

The truck is equipped with water tanks and pumps and modern sanitary plumbing. It rides on very large Firestone pneumatic tires. A large tent fly can be stretched from the top of the truck to a distance of 10 to 15 feet away. The driver sleeps on an especially devised seat which can be turned into a bunk at night. This unique body is mounted on a two-ton Indiana truck chassis, the frame having been lengthened to meet the body requirements. It is equipped with shock absorbers.

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NEW ENGLAND SAVOLD TO HAVE MANY FACTORY SERVICE STATIONS

THE New England Savold Tire Co., recently organized by prominent Boston business men and financiers to operate under the Savold process, will eventually have factory service stations in 20 cities from Bridgeport, Conn., on the Boston Post Road straight through to the Canadian line. In Connecticut service stations will be established in New Haven, New London, Hartford and Bridgeport, and in the State of Massachusetts in Boston, Springfield, Worcester, Haverhill, Newburyport, New Bedford, Lynn, Lowell and Lawrence. In New Hampshire stations will be located in Portsmouth and Manchester, while other factory service stations will be operated in Burlington, Vt., and in Providence and Newport, R. I. Four cities in Maine, Portland, Augusta, Bangor and Bar Harbor, will each have a Savold service station.

The headquarters and executive offices of the New England company are located in the Savold Tire building, 96-98 Brookline avenue, Boston. Following is a description of the Savold process:

"The tires given to be remade are first passed upon by a man, who is trained by years of experience, who in turn trains other men, passes on the tires that it is possible to remake so as to secure economical results to the user. After the tire has been passed by the inspector it is taken to the department where the tread is first removed by men who cut off the tread, after which it goes to men who, by the use of rotary power rasps and wire brushes, remove all the tread and cushion down to the fabric which composes the carcass of the tire.

"If it is found necessary to remove any of the fabric plies, by reason of separation or for any other cause, its place is taken by a new fabric. Before this is done, however, if there are any breaks in the fabric carcass such breaks, or ruptures, are carefully stepped down, after which the carcass is thoroughly dried, by the use of heat, to remove any moisture which the tire has absorbed while in use. This is absolutely necessary and vital, as proper adhesion cannot be secured if the old carcass is not thoroughly dried. When the tire is thoroughly dry it is carefully washed off with gasoline, or benzol, and is then cemented with a patented solution. It is necessary to use at least four coats of cement with an interval between each coat to permit of each being dried before the next coat is applied. This work is done in a room in which the temperature is from 80 to 100 degrees, as it is necessary to have this work done at this temperature so that the cement carcass will not absorb moisture which will prevent, as noted before, the proper curing of the new fabric plies and also the tread.

"After this operation the breaks, or ruptures, in the carcass of the tire are repaired by the use of new friction fabric and with the addition of additional plies of fabric—if any have been removed, as was noted before.

"In addition to the reinforcement, where necessary, on the outside, the tire is further reinforced by the use of two plies of fabric on the inside of the tire. This gives the tire a finish, which prevents the chafing of the inner tube, which would occur if this were not done. On this carcass, which has been properly repaired, where necessary, and cemented, is put the cushion stock, breaker and strip over the breaker. These units are put on in one operation and are carefully rolled down by the operator, after which it is ready for the tread.

"In the meantime, it having been determined as to the style of tread to be used, it has been buffed to remove the bloom, which is on the outside of most rubber goods and which is superfluous sulphur and other mineral ingredients in the rubber and which would prevent adhesion of the tread if it were not removed. After the buffing operation it is carefully wiped off, as noted before, the tread is cemented with four coats of cement, but with the same operation as the carcass has been put through and after properly drying it is ready to be put on the tire proper. The operator takes a piece of clean muslin, puts it around the tire smoothly and without wrinkles, and over this muslin he places the tread band. This operation is rather a delicate one, as after the tread and the raw rubber are united it is practically impossible to remove them. The function of the muslin being to prevent this until the tread has been properly centered and aligned on the carcass of the tire. After this has been done the muslin is removed, the tread carefully rolled and smoothed down and any air blisters which may have formed are carefully removed and after the tire has been passed upon by the inspector, as to workmanship, it is passed to the next operation, which consists of applying the matrix.

"It is necessary to use a matrix, which is composed of talc, water and glycerine. The function of the glycerine being to retain the moisture during the curing process; the function of the matrix being to prevent a distortion of the tread configurations and also to give proper support for uniting the tread to the carcass.

"After the matrix has been properly applied the tire is wrapped carefully with wet cloths, spirally, after which the tire is ready for the curing operation proper, which consists of being placed in a specially designed apparatus which have all the devices which can be applied to produce the effect desired, among which may be noted the tires are revolved during the process of curing; the curing apparatus being supplied also with humidifiers, which give the right degree of moisture, which is necessary to properly cure the tires; and also a thermostatic arrangement for regulating the heat.

"The tires are cured at the present time, which operation, by the way, we hope to materially reduce, from two and a half hours at 315 degrees to practically half of this time. Before the tire goes to the operator to be remade, and after it has been relined, it is mounted on a rim with a special air tube, which it is possible to inflate from 40 to 80 pounds pressure and which gives the necessary solidity to more firmly unite the tread with the carcass."

PANVAR MAKES OLD CARS LOOK JUST LIKE NEW.

When the finish of a car becomes dull or shoddy appearing, it does not always follow that the car should be completely repainted. A resurfacing coat of Panvar is probably all it needs. Car owners who have used Panvar have been completely satisfied. It is a refinisher that does its work in splendid style.

Panvar can be applied almost as quickly and as easily as a liquid polish, and it dries overnight. Panvar produces a similar effect to the gloss-finishing varnish that the body builders use as a final coat to give the car its brilliant luster. It gives a durable, transparent and self-leveling, flow-on finish.

Being transparent, it can be applied to any color of body. It is weather proof, will not discolor from heat or steam, will not crack, craze or peel and resists heat, acid and rust.

Panvar is also used for water-proofing tops of all kinds, for preserving the finish or polish of metal parts, preventing rust, for redressing shoddy-appearing leather or imitation leather tops, etc. It is economical because of its speedy application, convenience of use and tremendous covering power.

A quart is sufficient for a fair-sized car. The price is $1.50 for a quart and $5.50 for four quarts, with an additional charge of 25 cents a quart west of the Rockies. Those who would like to try Panvar should write to the Panvar Co., Bulletin building, Philadelphia.

The company also prepares Fix-A-Mar colors for "touching up" marred surfaces. Fix-A-Mar is put up in large tubes for quick, economical and convenient use. especially where only a small amount is needed at a time. As making repairs or matching colors on damaged surfaces is generally difficult, these handy tubes help greatly to make such repairs. Fix-A-Mar comes in these colors: Primrose, Italian Sienna, battleship gray, French auto gray, express red, mudia red, chrome medium, coach green light, express green, coach blue dark, brewster green and maroon. With the 12 colors and also black and white, many shades can be made. A color card will be sent by the company on receipt of a stamp.

UNITED MOTORS OPENS NEW BRANCH IN TORONTO.

United Motors Service, Inc., which is the authorized service department of Delco, Klaxon and Remy, with general offices in Detroit, has opened a branch in Toronto at 88 Adelaide street west. The branch is equipped to render expert service on all motor car electrical equipment.

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Prepare Questionnaire For Operators of Motor Vehicles in New York State

THE questionnaire to be answered by all motor vehicle operators, other than chauffeurs, in New York City, has been agreed upon at a conference of Francis M. Hugo, secretary of New York state, with the New York City Traffic Court magistrates and the representatives of various traffic and motoring bodies. Mr. Hugo explained that the questionnaire is not intended to perform the functions of a "written examination." It is merely an extended form of application for a license to operate a motor vehicle for more than 10 days in each year in Greater New York. The questionnaire follows:

State of New York, Secretary of State's Office, Automobile Bureau.

Application for operator's license. Before filling out, read the attached instructions carefully:

I, the undersigned, hereby, apply to the Secretary of State for a license to operate motor vehicles as an operator, and for that purpose answer the following questions:

1. Residence? Street and number, or R. F. D., postoffice, county, state.

2. Business address? Street and number, R. F. D., postoffice, county, state.

3. Residence preceding three years? First year. Second year. Third year.

4. Business, trade or profession?

5. How long have you been engaged therein, and, if employed, the name and address of your last employer? Name, address; from date to date.

6. Age, color, sex, weight, height, color eyes, color hair?

7. Have you ever used or gone by any other name than that given by you, or by any alias?

8. Are you a citizen? (a) If not a citizen state nationality.

(If naturalized, state when and where and native of what country. Date, place, nationality.)

9. Can you read English? Can you speak English? Can you write English?

10. Approximately how long and how many miles have you operated motor vehicles? (a) Have you ever operated a car in a large city? If so, how long?

11. Types of motor vehicle operated? (touring car, runabout, truck.) Motive power? (gasoline, electric, steam.) Transmission? (selective, progressive, planetary.)

12. Are you familiar with such parts of motor vehicles as are necessary to secure their safe operation? State the nature of your experience and any special qualifications or training you may have had.

13. Have you ever been licensed before as an operator or a chauffeur? If so, state as follows:—(a) Number of times? (b) By what state or locality? (c) For what years? (d) Whether as chauffeur or operator? (e) Number of last license?

14. Have you read the Motor Vehicle law of the State of New York? (a) Are you familiar with the State Highway Traffic law? (b) Are you familiar with the New York city traffic ordinances and the New York city police traffic regulations?

15. Have you ever had any accidents while operating a motor vehicle, and if so, state particulars. Number of times? place and injuries resulting?

16. Have you ever been convicted of a crime? If so, state the circumstances. (a) Have you ever been convicted of violating an ordinance relating to traffic? If so, state particulars. Number of times?



Nature of offenses? In what courts convicted? Date of conviction? Penalty imposed?

17. Have you ever had any motor vehicle license or certificate revoked or suspended in this state or elsewhere? (If so, give particulars.)

18. Have you ever been refused a license to operate a motor vehicle as operator or chauffeur? (If so, give particulars.)

19. Is your eyesight or hearing impaired in any way? (a) If your eyesight is impaired state whether or not you wear glasses.

20. Have you any organic affection of the heart, suffered an attack of epilepsy, stroke of paralysis, vertigo, or are you subject to fainting spells? (If so, give particulars.)

21. Are you crippled in any manner? (Give particulars.)

22. Have you ever been confined in any asylum or institution for the insane or for other mental affections? (a) Do you suffer from or are you undergoing treatment for any marked nervous affection?

23. Are you addicted to the use of intoxicating liquors, drugs or other narcotics in any form or manner? (a) Have you used liquors within the last year?

24. Have you ever been convicted of (1) public intoxication or other offense while intoxicated within one year, or (2) of the illegal use or possession of narcotics? (If so, state particulars.)

State where you desire your examination and road test.

(See list of places in instructions attached.)

State of New York, } ss:—
County of ——, }

On this .... day of ..... before me personally came ....., to me known and known to me to be the person described in and who executed the foregoing application, who, being by me duly sworn, did depose and say that he (she) knew the contents thereof, and that the statements and answers contained therein are true to the best of the applicant's knowledge, information and belief, and that the signature attached thereto is his (her) usual signature.

.....
(Notary Public, Commissioner of Deeds.)

CERTIFICATE OF CHARACTER.

1. I (being more than 25 years of age) have been a resident of..... for ..... years, residing at No. .....

2. My business or occupation is ..... and my place of business is No. .....

3. I have known the applicant for .... years.

4. I have read the application herein and from my acquaintance with the applicant I believe the statements made herein are worthy of belief.

5. That the applicant has not to my knowledge or belief any physical or mental weakness or infirmity or any habits which would in any way interfere with the proper management and control by him (her) of motor vehicles.

.....
(Name in full.)

WARNING.

Any person making a false statement in the verified application for registration, or in an application for a license, or any proof or statement in writing in connection therewith, or who shall deceive or substitute, or cause another to deceive or substitute in connection with any examination hereunder, shall be guilty of a misdemeanor, punishable by a fine of $500, imprisonment for one year, or both.

The only fee you are requested to pay is for the original application. Any money paid to any person to influence the granting of a license to you is wasted. Any person attempting to bribe, or any person bribing, directly or indirectly, any person connected with the office of the secretary of state, will be prosecuted to the fullest extent of the law.

REFLEX IGNITION CO. MOVES INTO ITS NEW HOME.

The Reflex Ignition Co., maker of Reflex spark plugs, has moved into its recently completed plant on West 106th street, Cleveland, O. The new quarters are spacious and modern, and were made necessary by the rapidly growing demand for Reflex plugs. Provision has been made for further expansion. A spur on the N. Y. C. line means easy shipping. Straight line factory production has been worked out to the most minute detail.

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PRICES JUMP AS CAR SHORTAGE CONTINUES

NEW models of automobiles coming on the market fail to embody any radical changes. Improvements in detail have been added that make the cars better than their predecessors, just as the cars of 1919 were improvements of the cars of 1918, but those who expected that the extensive use of motor vehicles in the war would bring about radical changes will be disappointed, if they examine the specifications that so far have been announced.

Prices, it is believed in the industry, must inevitably go down, but not right away. Although the industry is getting back into full swing and big production, the materials and labor situation are such that prices instead of turning downward have taken a distinctly upward swing. This condition, it is believed, will continue throughout the year, because the market for cars cannot possibly be satisfied in the next six months. What will happen next spring is entirely a matter of speculation.

Distributors throughout the country estimate that there is a demand for not less than 500,000 closed cars for delivery to consumers not later than Jan. 1. The closed car builders report that they cannot build more than 230,000 in time for the car makers to mount them and make delivery to their distributors by January.

As a result of this condition the price of closed cars is increasing. Very few dealers are even now able to give customers any promise of delivery on the stock models, and special closed bodies of all types are already beyond the reach of the average buyer.

If materials can be obtained at reasonable prices and the labor market becomes settled, the competitive state of the motor vehicle industry will surely cause a scaling down of prices by spring. But close observers of conditions are inclined to believe that another year at least must elapse before the great deficit in the supply of motor vehicles is overcome, and that not until then will there be much revision downward.

War Great Educator.

While the war did not cause any discoveries of tremendous moment that will revolutionize the methods of construction that have been followed in recent years in producing cars for the general public, it was a great educator. Such a test that was given the cars and trucks that took part in the long struggle on the various fronts revealed opportunities for improvement in almost every part of the structure of the vehicle, in frame, wheels, spring, motor, transmission, final drive, axles, bodies and control. It is this information that is being applied to the new models.

There is no widespread leap to the multi-cylinder field, as some expected would result from the development of the airplane motor. The companies that have been producing multi-cylinder cars will continue to build them and there will be about the same relative number of eights and twelves on the market as there are at present. Some of the new concerns that are preparing to enter the business in the 1920 season will undoubtedly produce multi-cylinder cars, as the smoothness of operation of this type of power plant has a strong appeal to the motorist.

Indications, however, are that the trend that was apparent in this year's product will be continued. That is distinctly toward the improvement of the six and four with the aim of giving them the flexibility of control that is the great appeal of the eight and twelve. The employment of double sets of valves is a means to this end that is being extended and improved carburetion is another step in the same direction.

New manufacturers are entering the field, for the most part with the idea of going after the vast market for low and medium priced cars. Another six months, when the shows are in progress, the public may see a large number of cars of this type, mostly of the four and six-cylinder types.

However, producers of the expensive, luxurious cars have yet seen nothing to induce them to change their policy of building the best that can be built, and they feel certain that their market will increase rather than diminish. Even in the face of rising costs they have not changed their policy. New models of these cars are refined to the last detail in every part of their mechanism and body work, but they introduce no departure from former practises in the essential features.

There continues a constant demand from the sales departments for novelties in bodies, and it is practically certain that they will be forthcoming. Straight lines gave way to curves and curves to straight lines again, and with each succeeding change the grace of the bodies advanced. It is probable that the turn for the curves will soon come again; indeed, a trend in that direction is evident in some of the newest models of enclosed cars that have been produced for the fall trade.

Advances in Prices.

Touring car price advances ranged from $50 to more than $1000. Locomobile has announced a greater price jump than any, advancing $1100 on open cars and $1400 on closed models, with still greater increase on special body jobs, necessary, as explained by the company, to maintain and develop production up to customary standard under present costs. The new schedule of Locomobile prices brings the touring car from $7000 to $8100, the special four-passenger touring from $7100 to $8200, the limousine and landaulet from $8200 to $9600, the chassis alone jumping from $6000 to $7100, and with custom bodies coming as high as $11,000. The company will continue its policy of limited production.

Chalmers prices are $120 ahead on five-passenger models and $150 on seven-passenger, all effective at once.

The Maxwell touring car has been raised $90 to $985.

Cadillac is up on six out of 13 of its models, open touring models remaining the same and will probably continue so, but closed cars are increased from $100 to $300.

Studebaker has gone up $100 on touring and open models and $150 on closed cars, and Hudson inaugurated an advance of $125 on all models, with a $200 rise in the Essex phaeton, from $1395 to $1595, the five-passenger sedan remaining $2250.

The price of the Oldsmobile eight has been increased from $1795 to $1895. Although the price of other models remains unchanged, every indication points to extension of the increase in the immediate future.

The Chevrolet Motor Co., it is rumored, will inaugurate a new and higher price schedule on all models in August.

The Paige-Detroit Motor Car Co. will bring out its new series very shortly and it is altogether probable that the price will go up within 30 days. The Hupp Motor Car Corporation prices have been guaranteed until Aug. 1.

Buick has advanced $100 on closed cars, the touring model remaining as in the spring, but deliveries are far behind orders and the company does not expect to be able to produce more than half the closed cars demanded by its dealers.

Pierce-Arrow prices have been up since June 24. The five-passenger touring is $7650; seven-passenger touring, $7750; closed cars range from $9050 to $9450.

Mitchell cars in the improved model, "E-40," were raised $100 July 1, the new price being $1575. The new Liberty closed models, a four-passenger coupe and a five-passenger car, are offered at lowered prices, the former at $2370 and the latter at $2470.

Tire Makers Decide Not To Cut Prices

It is understood that the big tire companies have abandoned the plan of making a further reduction in tire prices this midsummer. Late in April when the 15 per cent. May cut was definitely agreed upon, it was tentatively decided to make another cut in August in order to keep the industry on a healthy basis with respect to margin of profit and give the consumer the benefit of lower rubber prices.

Of late, however, the cost of cotton fabric has advanced to such an extent as to preclude a big reduction in the price of finished tires. Consequently the big Akron companies will maintain the standard price policy.

Champion Spark Plug Co. plans output of 35,000,000 plugs in 1919, an increase of 10,000,000 over 1918, and representing 65 per cent. of the country's output.

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UNITED MOTORS TAKES ON JAXON RIMS SERVICE.

United Motors Service, Inc., with its 15 branches and 38 distributing stations throughout the country, has added the service of rims and rim parts of the Jaxon Steel Products Co., Jackson, Mich., to its accounts. The company plans to take over other new accounts which it will undertake to departmentalize so that specialization along various parts of the car may be accomplished by the org- ization. Arrangements for handling the Jaxon rim service were made when the Bearings Service Co., Detroit, decided to concentrate its entire energies upon bearings service exclusively. A. D. Trempe, who has had general supervision of the rims service of the Bearings company, will supervise the rims service of the United.

HART-PARR MEN TO DISTRIBUTE IN TEXAS TERRITORY.

A. H. Grover and Byron Snyder have opened a distributing house at Dallas, Tex. They were formerly connected with the Northern Hart-Parr Co., Minneapolis. Recently they sold their interest to Mr. Warner, the third partner, and contracted for southern Oklahoma and the State of Texas, excepting the panhandle and the extreme southwest. Mr. Grover was directing the sales at the Northern Hart-Parr Co. and Mr. Snyder the office. The Texas Hart-Parr Co., as the new firm has been named, has leased a good location at Main and Houston streets, in the machinery section of Dallas, and already has tractors on the ground. As there are many old Hart-Parr 60's in Texas, the new firm will not find the name Hart-Parr unknown.

UNLIMITED GUARANTEE ON ALL GOODYEAR TIRES.

The Goodyear Tire and Rubber Co., Akron, O., has announced an unlimited guarantee on all tires made by the company, whether pneumatic, solid or cushion. All tires are guaranteed to be perfect during their entire life, without limitation as to mileage or length of service.

MALDEN, MASS., POLICE HAVE TRAPS FOR MOTORISTS.

The police of Malden, Mass., have been enforcing these traps: On Highland avenue, Pleasant street, Mountain avenue, Main street and Eastern avenue. Traps are placed for those not sounding horns. In Malden square motorists should not pass trolley cars that are not in motion.

GENERAL MOTORS.

General Motors officials emphatically deny reports that the company may take over Pierce-Arrow and Stutz. General Motors will not spend money for acquisition of additional automobile plants. It will make huge outlays for additions and improvements to its present holdings in order greatly to increase production.

WRIGLEY ENTERS AUTOMOBILE FIELD.

Wm. Wrigley, Jr., the chewing gum king, has extended his activities from chicle and baseball to the automobile industry. He has just been elected a director in the Auburn Automotive Co., after having purchased a large block of stock in the enlarged Indiana corporation. After 19 years of manufacturing, the Auburn Automobile Co., with an unprecedented business on its books for the year, decided to practically treble its output, with the result that the official personnel has been considerably strengthened through the addition of men well known in business and finance.

Maurice Eckhart, president and general manager, who has been with the company since its inception, continues in the same capacity, as does J. I. Farley, second vice president and general sales manager. The new men who become directors of the Auburn Automobile Co. along with Wm. Wrigley, Jr., are A. P. Kemp, formerly vice president of the H. H. Franklin Manufacturing Co., who becomes first vice president and treasurer of the Auburn Automobile Co.; H. H. Hitchcock, formerly vice president of the First National Bank, Chicago; Ralph A. Baird of F. B. Hitchcock & Co., and Judge James H. Rose of Ft. Wayne, Ind.

FULLER & SONS MFG. CO. OPENS NEW YORK OFFICE.

The Fuller & Sons Manufacturing Co., Kalamazoo, Mich., announces the opening of a New York office at 22 American Circle building, 1834 Broadway, with F. George Walker in charge. This company is making a complete line of motor car, motor truck and tractor transmissions.

"GETTYSBURG FOR THE MOTORIST."

It is said that the number of automobile tourists who visit the Gettysburg battlefield each year now exceeds the number engaged on both sides there on July 1, 2 and 3, 1863. Road travelers have the best means of observing the topographic features of the surrounding country, as well as the battle area itself, but in order to make the trip thoroughly interesting and enjoyable the reference data should be written from the special viewpoint of the tourist and made available in convenient, inexpensive form. This has been done in a 32-page brochure, which includes a map of Gettysburg, showing the principal streets and avenues leading in and out; a special map of the battlefield and a number of fine illustrations.

"Gettysburg for the Motorist," price 50 cents, has been prepared by and may be ordered from Robert Bruce, Clinton, Oneida Co., New York.

ROOT & VAN DERVOORT HAS BIG CAPITAL INCREASE.

Capital stock of the Root & Van Dervoort Engineering Co., East Moline, Ill., maker of the R. & V. stationary engine, Moline-Knight automobile and R. & V. automobile and tractor engines, has been increased to $7,500,000 from $1,346,200. The issues will be divided into $2,500,000 common stock and $5,000,000 eight per cent. preferred stock.

This increase will in no way affect the control of the business, and the personnel and management will remain the same. The board of directors is increased from seven to nine. Large capital was provided to enable the company to increase its manufacturing facilities and greatly increase production. Important expansion of the automobile department will result almost immediately. New models of cars are being developed and a new model of the Moline-Knight motor will be put out soon. The output of automobile and tractor motors and engines will be greatly increased.

STORM MANUFACTURING CO. GOES TO LARGER QUARTERS.

The Storm Manufacturing Co., Thompson, Ia., announces that on and after Aug. 1 its main office and factory will be located at Fourth street and Sixth avenue, S., Minneapolis, Minn., and that its Thompson, Ia., shops will be continued for manufacturing purposes only.

The company's rapidly increasing business demanded considerable more floor space and better shipping facilities, both of which are accomplished by this change. The new home is a strictly modern structure, well lighted and affording ample room for present needs, as well as provision for expansion.

The location is not entirely new to the company, as its Minneapolis branch factory has occupied the first floor space in the building for the last two years, and the present change is in accordance with the original plans.

The company makes the well known line of Storm cylinder reboring machines, both for hand and power operation; also connecting rod bearing reamers, jigs and straightening gauges, valve port renewing tools, main bearing babbitting and boring tools, piston vises and also special pistons for all makes of motors in different oversizes.



Storm Manufacturing Co.'s New Building.

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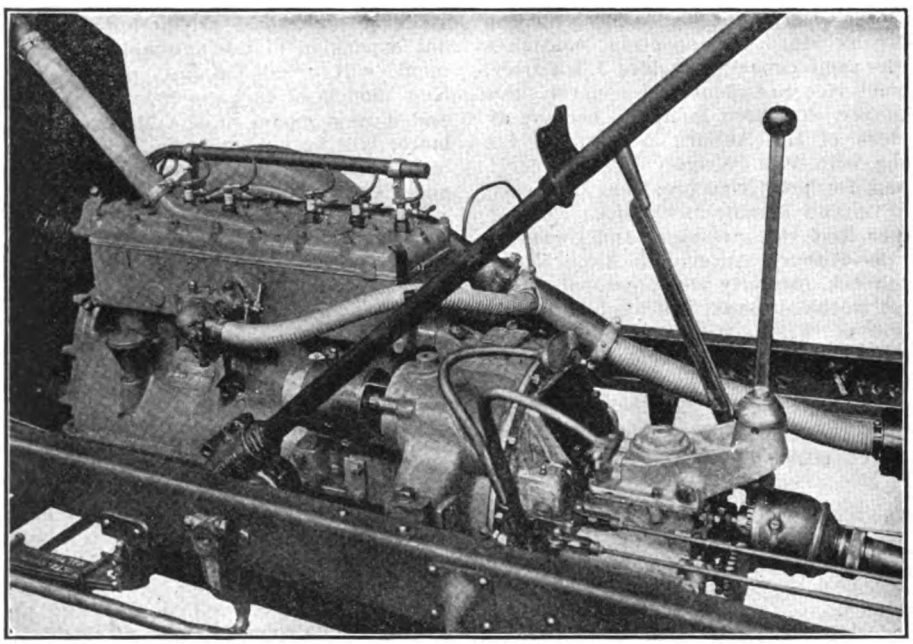
BIG DEMAND FOR METZ MASTER SIX CARS

Speed Up Production to Keep Pace with Orders

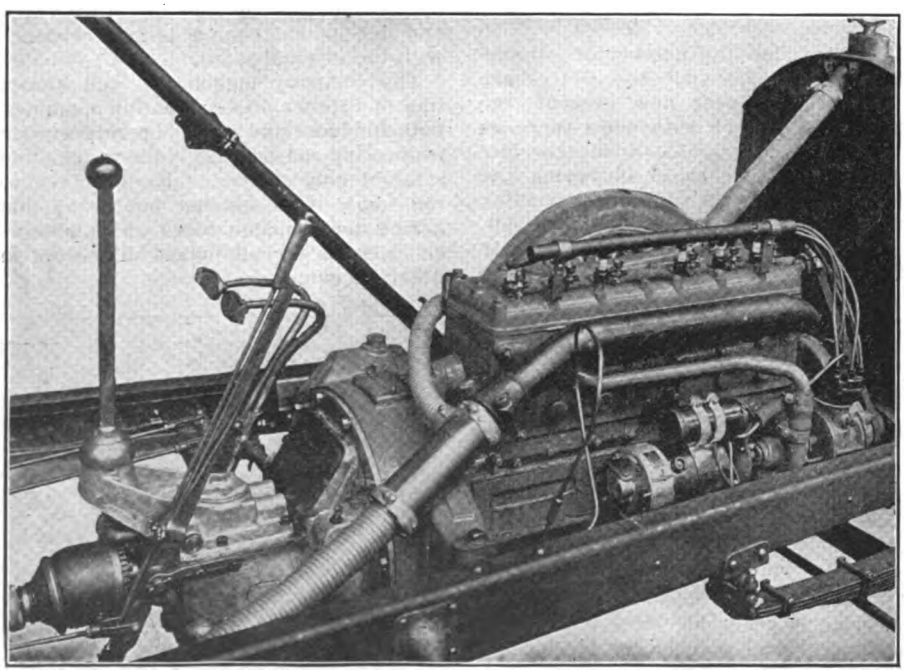
BECAUSE of the constantly increasing demand for the Metz Master Six cars, the Metz Co., Waltham, Mass., will devote its entire plant to car building. This plant covers eight acres, and 2600 persons were employed there in war work.

The Metz Sales Corporation, Metz building, 920 Boylston street, Boston, is the selling representative for the Metz Co. R. A. Pickens, who has been connected with the Metz interests for a number of years, is treasurer and general manager of the corporation. He has developed a strong sales organization in the East and he plans to increase this until the corporation is represented in practically every commercial center of the country. Satisfactory export connections have already been made.

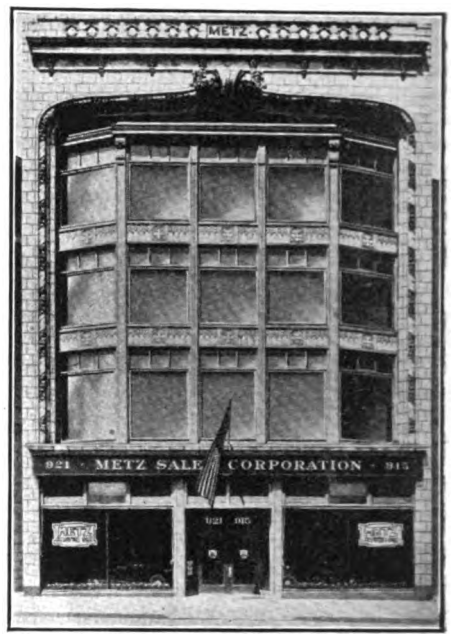
The Metz Co. is now well advanced in production, although thus far it has been impossible to keep pace with the demand. The new Metz Master Six was designed by C. H. Metz, founder of the Metz Co. Mr. Metz has been prominently identified with the automotive industry for a quarter of a century. In the Master Six he has created a car that has won instant favor.



Left or Intake Side of the Metz Master Six Engine with the Carburetor and Westinghouse Starting Motor and Control Members Shown.



Right or Valve Side of the Metz Master Six Engine, Showing the Water Pump, Westinghouse Generator and Distributor.



Metz Building, 920 Boylston Street, Boston, Location of Executive Office of the Metz Sales Corporation.

High Quality Units.

Every unit incorporated in the Metz is a product of a specializing concern that is recognized for high quality. The company points with pride to the fact that the machine in every detail represents the experience of not only the best specialists, but of one who has combined in one design all that is good of all other designs and obviated every factor that mature knowledge had shown might be criticised or would detract from the extremely high standard of engineering that had been sought.

The main units include a Rutenber six-cylinder engine, a Borg & Beck dry disc clutch, a Brown-Lipe transmission gearset, a Timken front axle, Perfection springs, a specially built radiator, a Stromberg carburetor, a Westinghouse two-unit lighting and starting system, a Connecticut distributor, with all auxiliaries of equal quality.

The chassis are fitted with a five-passenger touring body, a three-passenger roadster body, a four-passenger coupe body, a sedan body or a speedster, which is equipped with disc steel wheels, and two extra wheels that are carried on a running board. The prices for these cars are: Touring, $1695; roadster, $1695; coupe, $2495; sedan, $2595; speedster, $2795.

Pride in Custom Work.

The touring car is equipped with a one-man top with curtains and top boot, the curtains being carried in a pocket in the top, and the material is Dreadnaught top fabric. The equipment for the touring model includes a rain vision ventilating

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windshield, a speedometer, a motor driven horn, headlights with auxiliary lamps; dash, rear compartment and tail lamps; an ammeter, an oil pressure indicator, front and rear bumpers, an extra wire wheel mounted at the rear with special carrier and safety lock, a special robe rail, a pump, a jack, a tool kit in a special pocket, a tire repair outfit, an ignition lock and special brackets for license plates.

All of the bodies are built by the Metz Co., which takes great pride in its custom work. The bodies are built to streamline effect and are finished in royal blue as a standard color, with black enameled fenders and trimmings. The upholstery is straight piped fitted leather seat and back cushions for the open bodies, the closed bodies being upholstered with fabric or leather as may be ordered, with fabric the standard. The front footboard and the running boards are covered with linoleum, and the floor of the rear compartment is carpeted.

The source of the ignition current is a Willard storage battery, six volts, 120 ampere hours capacity, which is charged by the generator of the Westinghouse two-unit starting and lighting system. This current is directed to the cylinders by a Connecticut distributor and there is a uniformly effective spark generated at all times in each cylinder, so that there is positive engine efficiency.

The Power Transmission System.

The clutch is a Borg & Beck 10-inch dry disc type that is self-adjusting and requires practically no lubrication, and is completely enclosed in the housing. It is claimed to be extremely easy to engage and to be positive in action. This is combined with a Brown-Lipe transmission gearset, a sliding gear selective type having three forward speed ratios and reverse. The shafts and gears are very large and have unusual endurance. The shafts are a special alloy steel and the gears are nickel steel, and the shafts are carried on annular ball bearings. The gearset is enclosed in an aluminum case. The gear shifting lever is mounted in an offset bracket at the rear of the case and this is a ball and socket type.

The power is transmitted from the engine to the rear axle by a long, tubular shaft with a universal joint at either end, the joints being fully housed and packed with grease. The rear axle is a Timken three-quarters floating construction, and is driven by a helical bevel pinion and master gear. The axle housing is pressed steel and there is a large rear cover plate on the central section at the rear. By removing this plate the differential gearset is easily accessible. The differential gearset and the pinion shaft are assembled on the forward plate of the central section of the axle housing. The wheels are driven by shafts that are seated in the bores of the differential gears, the outer ends of which are bolted to the hubs. The housing is webbed to obtain strength. The driving shafts may be taken out without removing the wheels and adjustments may be made to all the bearings, which are the Timken roller type.

Live-Wire Officials in Metz Organization

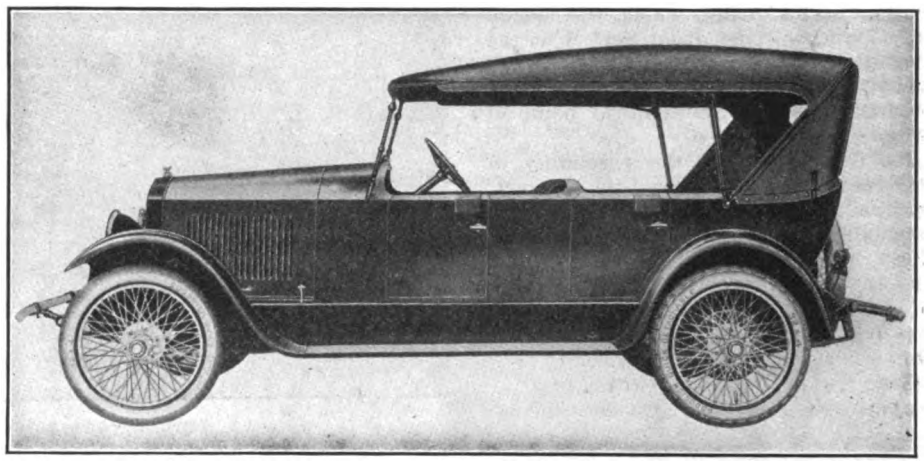


C. H. Metz, Designer of the New Metz Master Six Series of Car.

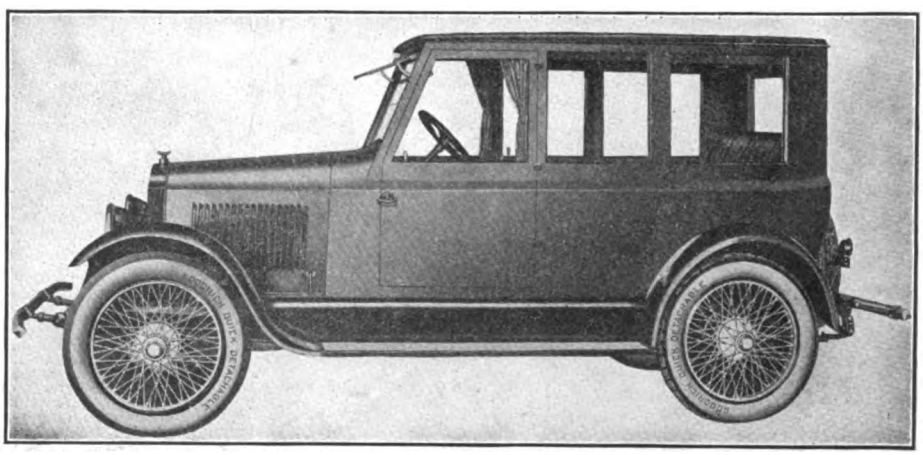


R. A. Pickens, Executive of the Metz Sales Corporation, Metz Car Distributor.

All of the other mechanical features are in accordance with the best automotive engineering standards, and, combined, they go to make up a car that is bound to give satisfaction and make the owner proud of his choice of the Metz.

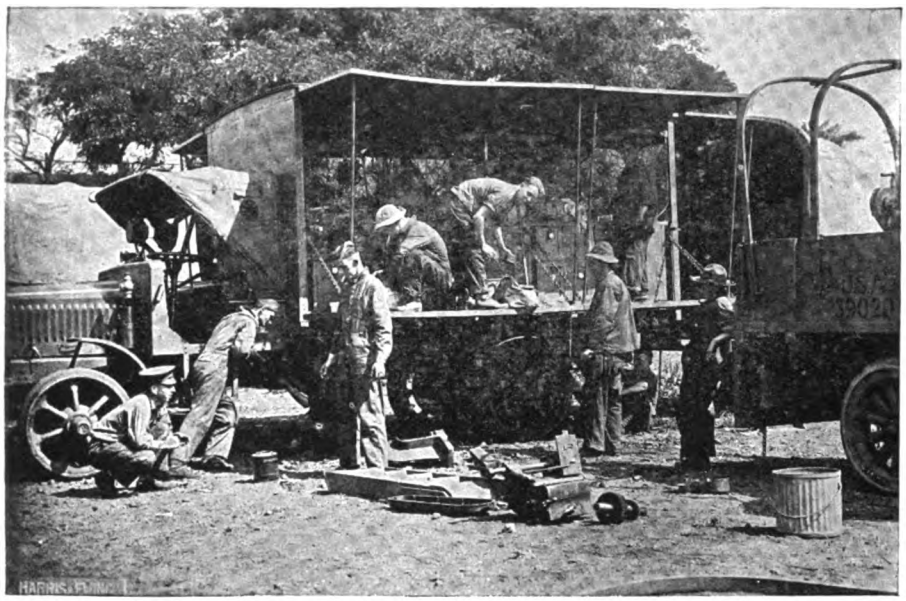


Metz Master Six Chassis with Five-Passenger Touring Car Body and Complete Standard Equipment.



Metz Master Six Chassis with a Sedan Body Seating Five Passengers and Complete Standard Equipment.

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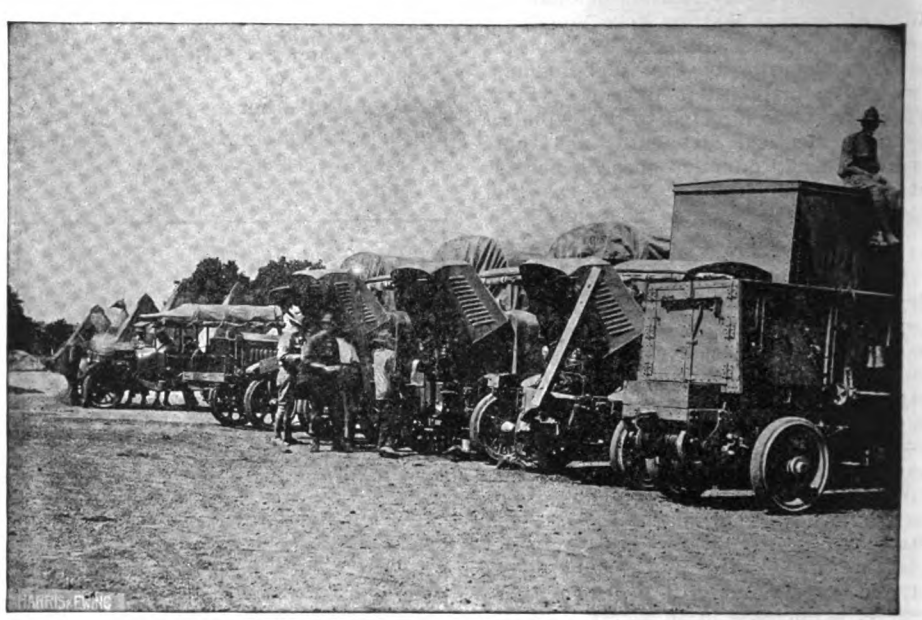
Fitting Army Train For Trip Across Continent

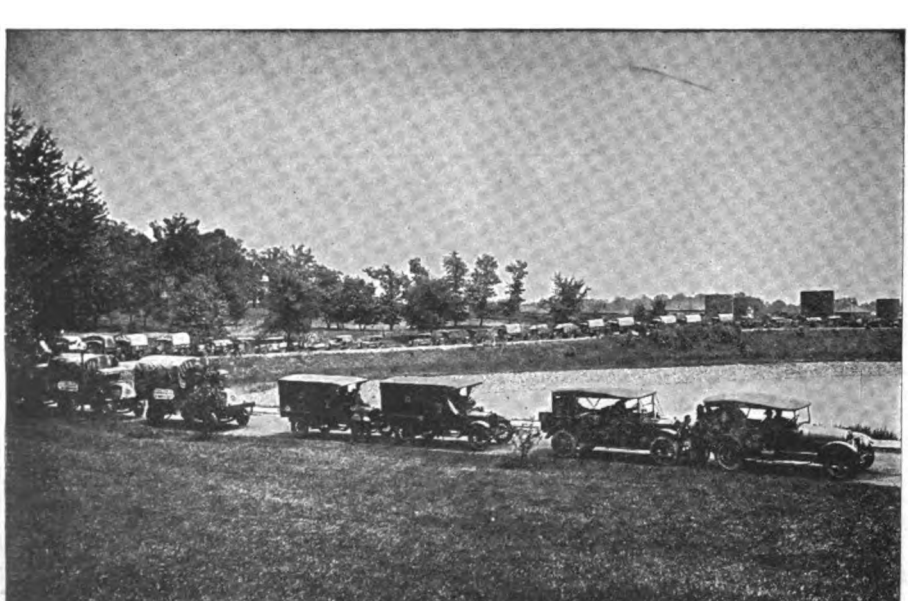
The preparations for the transcontinental march that is now being made by two companies of the Motor Transport Corps and several detachments of the United States Army, which was begun July 7 and will end about Sept. 1 at the Presidio, Cal., was an undertaking on which depended the success of the demonstration from a mechanical point of view.

No one questioned the possibility of the vehicles being driven the distance, but as the march was to be made to schedule and retardation from failure of the vehicles from any cause that could be anticipated would establish insufficient preparedness, a great deal of care was taken to be sure that all of the machines were in prime condition.

The system the vogue with the army service does not accept excuses and orders are followed literally to the letter. Every provision that could be made to insure the convoy being self-sustaining was given attention. Probably no one thing was more important than inspection and lubrication of the cars and trucks, and this was carried out systematically. Every adjustment was made to a standard and every truck and car was thoroughly oiled and greased, so there would be no possibility of lack of lubricant.

The train includes a repair shop equipped with the same machinery that was used in the field repair shops in foreign service and a sufficient stock of parts of each type and make of truck was provided so that in the event of breakage or excessive wear replacement can be made with the least practical delay. The field repair shop is equipped with several all-purpose machine tools, driven by the engine, and every hand tool that experience would dictate was necessary. The companies include a number of expert mechanics who are qualified to work on any of the trucks and cars.





The supplies carried included materials from which temporary repairs could be made, and the possibilities of uses of these in necessary work was one of the details under observation. The preparations were continued over a number of days and with military discipline were carried out in every detail. After the train was in readiness for the march the different units were finally inspected at Meigs Field and each was found to be mechanically fit.

Different lubricants were used with a view of making comparison of results obtained with each make, and the differentials and transmission gearsets of a group of the machines were filled with Dixon's greases.

The accompanying illustrations were made by Harris & Ewing, Washington, D. C., the upper showing a field machine shop being stocked for the march, the center showing the final inspection at Meigs Field, and the lower the convoy after the start, leaving the capital for the Golden Gate.

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THE MAKING OF A SPARK PLUG

Highly Developed Engineering and Scientific Methods of Production Insure Exceptional Efficiency from Red Head Products.

PRIMARILY automobile vehicle propulsion depends upon two factors, the quality of the fuel and the manner of burning it. This statement may be applied to all internal explosion engines. The fuel is supplied through the carburetor and it is burned by igniting it with an electric spark generated in each engine cylinder.



Putting the Electrodes Into the Insulating Cores and Filling the Bores with a Vitrifying Cement at 50 Pounds Air Pressure.

This statement may appear so elemental as to cause the reader to wonder why it has been made, but the object is to emphasize that acceptance of a fact does not mean that it is understood. For instance, the driver of an automobile may know nothing of automotive mechanics; he may have some theoretical knowledge or some practical experience with which he determines engine or vehicle operation with reference to his standard, but he may be incapable of making a trifling adjustment accurately.

Power Losses by Heat and Friction.

The carburetor and the magneto, timer or distributor are generally believed to be the sources or origin of the combustible gas and the electric spark that ignites it, and that upon them the efficiency of the engine and the vehicle depends. Both are carefully designed and perfected instruments that can be adjusted with reference to each other so that an experienced driver will be reasonably certain of obtaining dependable engine operation.

Engine Functioning Depends on Plugs.

But rarely does any motorist realize that the functioning of both the carburetor and the source of ignition depends upon the spark plug, which as a matter of fact is the only means of energizing the engine. The spark plug may appear to be extremely simple in design, in construction, in adjustment, and yet it is quite as important as the carburetor or the magneto. Because automobile owners and drivers assume they know is the principal reason why the spark plug and its relation to engine efficiency is ignored or disregarded.

Were spark plugs better understood there would be far greater fuel and lubricant economy, engines and vehicles would afford much more satisfaction, and there would be a surprising saving in bills that are incurred for "adjustments" that are absolutely unnecessary.

With reference to fuel consumption. Taking an engine that is "normal" on the testing stand, not one that has been more or less reduced in capacity because of neglect or ignorance, which applies to the engine found in the car or truck in ordinary daily use, a surprisingly small ratio of useful energy is produced when measured by the full value of the fuel. Without considering the possibilities of loss of energy other than those that are believed to be inherent in automotive practise, the best authorities are agreed upon these approximations of loss with reference to diffusion of heat—and the internal explosion engine is essentially a heat engine, which are shown in an accompanying tabulation.

Cooling water	35.8	
Exhaust gas, direct radiation	35.6	
Exhaust pipes	1.0	
Muffler	1.2	
Total	73.6	73.6
The losses by friction are as follows:		
Engine friction	5.6	
Transmission friction	2.9	
Total	8.5	8.5
Losses in wheels and tires:		
Rear tires	3.7	
Front tires	1.1	
Front wheels	0.6	
Total	5.4	5.4
Total		87.5

Accepting these figures there is a total loss of 87.5 per cent. of the energy value of the fuel in delivering power at the rear wheels, and of the 12.5 per cent. that is delivered 7.1 per cent. is necessary to compensate for air resistance. This leaves 5.4 power available for crossing surfaces where the traction is poor or heavy and for climbing hills.

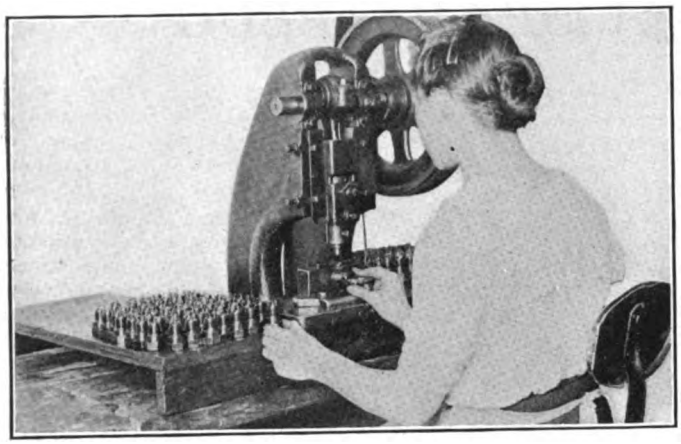
Obviously there is vital need of obtaining the largest practical degree of combustion in the cylinders of the engine, and this is not obtainable unless the spark plugs are perfectly set so that the ignition will take place at the time when the expansive force will most effectually develop power. Each spark plug creates a spark in a cylinder when the electric circuit is made and the current "jumps" or arcs at the points of the electrodes. The electrical energy originates in the magneto or battery and it is distributed to the different cylinders at the times when the pistons are at a certain position in them, the position depending upon a number of factors, including engine speed, the type of ignition system, the fuel and the temperature and volume of moisture in the air.

Combustion of fuel in the engine cylinders will take place with almost inconceivable rapidity. High speed engines have been driven to nearly 4000 revolutions a minute. Single-cylinder engines have been built in France that have maximum speed in excess of 3600 revolutions, which means more than 1800 separate piston impulses a minute or 30 a



The Electrodes and Insulators, After Drying, Are Placed in Ovens and Exposed to High Temperature to Bake the Cement That Retains the Electrodes in the Bores.

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"Staking-In" the Fish Hook-Shaped Shell Electrodes Into the Spark Plug Shells—A Single Operation on a Specially Designed Power Press.

second, and there is probability that this number could be exceeded. This applies to a single cylinder, and as the number of cylinders is increased the number of impulses a minute for the engine increases in ratio.

This will be better determined by reference to the following tabulation:

No. Cyl.	Engine R.P.M.	Power Impulses a Minute	Ignition Sparks a Minute a Cylinder	Ignition Sparks a Minute an Engine	Ignition Sparks a Second a Cylinder	Ignition Sparks a Second an Engine
1	1000	500	500	500	8.33	8.33
2	1000	1000	500	1000	8.33	16.66
4	1000	2000	500	2000	8.33	33.33
6	1000	3000	500	3000	8.33	50.00
8	1000	4000	500	4000	8.33	66.66
12	1000	6000	500	6000	8.33	100.00

Combustion Heat Is Intense.

The heat generated in the cylinder at the instant of combustion is intense. The temperatures will vary from 3000 to perhaps 4000 degrees Fahrenheit, which intensity is illustrated by comparing the heat at which steel fuses, or about 2550 Fahrenheit. The mean temperature of the cylinder is much lower because it is reduced as the piston descends for the power stroke, is cooled somewhat by the exhaust stroke, and is cooled decidedly during the intake or suction stroke and to some degree while the cool fuel gas is being compressed.

While the engine is in motion these cycles are repeated. The tabulation shows that with engine speed of 1000 revolutions there will be an average of 500 power impulses for each cylinder, and an average of 8.33 ignition sparks created a second. This may appear to be comparatively slow, but from 1800 to 2400 revolutions a minute is not uncommon with standard automobile engines, and from 3000 to 3600 is sometimes reached with racing car engines. The maximum stated would be approximately 29 power impulses a second to a cylinder.

Great Rapidity of Combustion.

But the term power impulses does not represent the rapidity of the consumption of the fuel in the cylinder. Considering the period of combustion, if the engine is running 1000 revolutions a minute and each cylinder has 500 power impulses the time for each impulse revolution is slightly more than 1/6 second and if the spark is made 15 degrees advanced or before top center, and with 360 degrees for a revolution, the time for ignition would be 15/360, which allows 1/24 of the time for one revolution, or 1/144th of a second, for the gas to burn and create the expansive force within the cylinder. This is so brief a period that it is not possible to make comparison. Yet in that time the electric spark must create a flame that will spread through every part of the combustion head. If the combustion chamber is irregular the flame will not be uniform in its progress in all directions from the electrodes of the spark plug, which is held to be the reason why L and T-head cylinder engines are either slower in action or develop less power than engines with valves in the heads of the cylinders.

What a Perfect Plug Will Do.

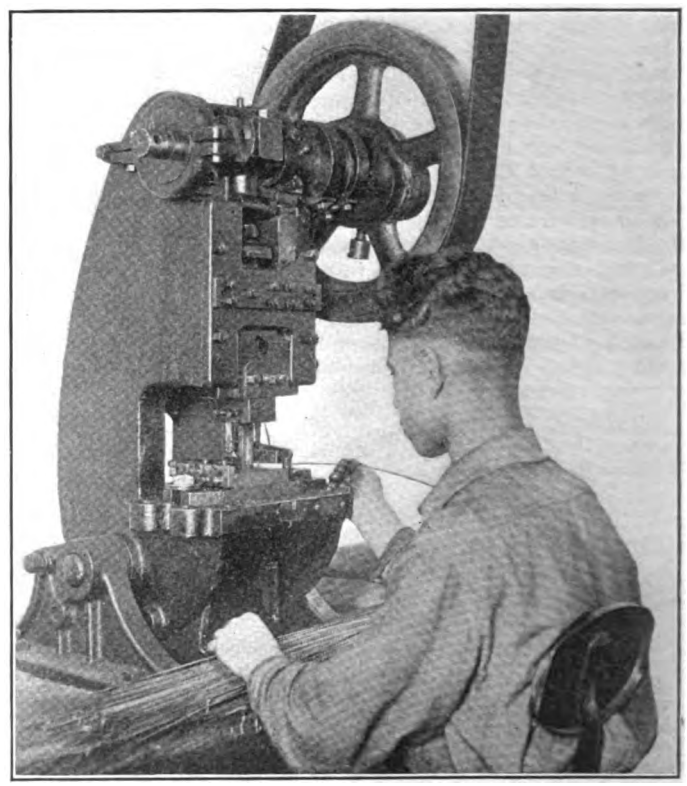
The functioning of the spark plug may be dependent upon numerous conditions. A perfect plug must be so constructed that it will deliver the full voltage developed by the magneto, the coil or the combination of the two at its electrodes. The electrodes must be so set that the spark created when the current "arcs" between them will have sufficient intensity to ignite the gas. It must be perfectly insulated. It must be so formed that oil will not accumulate on the shell and the insulation of the center electrode and, when baked or carbonized, will not cause a short circuit. It must not leak either at the bushing or the shell, for leakage will lessen compression and cause loss of power, carbonization and necessitate greater consumption of fuel. The insulation of the center electrode must be such a nature that it will not absorb oil and short circuits, will not crack under the extreme variations of heat and it should be so assembled that it may be cleaned readily.

General Spark Plug Construction.

The spark plug is usually constructed with a shell, so-called, which is either steel or brass or bronze, that is shaped at the upper section to seat a wrench. There may be other forms, but it ordinarily is hexagonal. The lower part of the outside of the shell is threaded to screw into the tapped bore in the cylinder head. Through the center of the shell is a bore, the lower part of which is smaller than the upper, and there is a shoulder surrounding the smaller bore on which is seated the insulation of the center electrode, which may be stone, porcelain, mica or other material that is not a conductor of electric current.

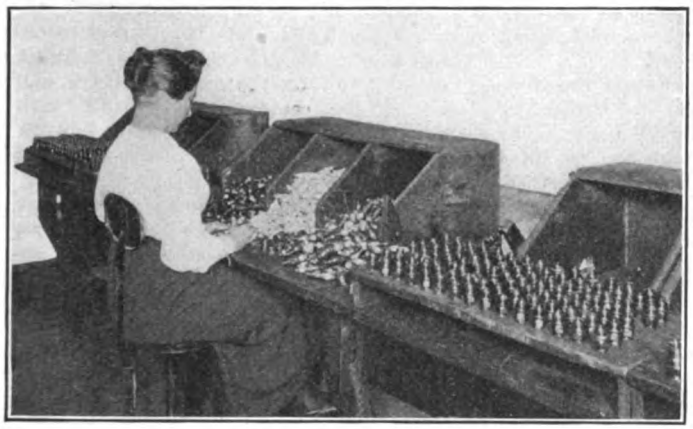
The bushing is either brass or steel and is a short section with a hexagonal collar that is a seat for a wrench, with the external length below it threaded to screw into the larger internal bore of the shell, and the bore of the bushing is such that it is a loose fit for the upper end of the insulation of the center electrode. The insulator of the center electrode is shaped to have a central collar at a point usually below the middle and at either side of this collar is placed a packing that seats against the shell and the bushing, so that when the bushing is screwed into the shell and seated there shall be no leakage past the gaskets of either air or gas.

The center electrode extends through the insulation, the upper end being threaded and the lower end either straight or shaped. On the upper end



Cutting the Center Electrodes from Nickel-Manganese Steel Wire, These Being in Two Types and Two Sizes of Stock, on a Special Press.

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Assembling the Bushing, Shell, Insulator or Core Complete and the Gaskets After the Tests of the Different Parts to Insure Against Defects.

is generally placed a binding nut with a milled edge that is screwed tightly against the insulation. There is a small lock washer and a knurled nut that serves to retain the terminal of the cable or wire securely against the binding nut and the electrode. The shell electrode is a piece of round metal anchored into a bore or secured in a manner that will insure electric conductivity that can be adjusted with relation to the center electrode, so that the gap or space between them may be from 1/32 inch for battery current or from 1/50 to 1/64 inch for magneto current.

Many Types and Designs for Plugs.

What has been stated with reference to design and construction applies generally to any spark plug. There are, of course, many different types and the dimensions of the several members of the plugs will vary, and the materials will differ. There are special designs that are intended to meet the requirements of certain engines. As a rule manufacturers produce spark plugs to S. A. E. dimensions and special types and sizes which demand may justify.

The spark plug that will endure, that will have high electrical efficiency, will afford the greatest fuel economy, because it will cause the fullest consumption and produce the largest degree of power from a given volume. It will contribute to the satisfaction of the owner because with adequate power he will have ease of acceleration, flexibility of operation and smoothness of power delivery that will be superior to cars not so well equipped.

Again, there is the insurance against defects of ignition that are regarded as inseparable from electric systems, which cause annoyance and inconvenience and discomfort. There is material reduction of expense for adjustments and repairs of the car that originate frequently and require expert examination to determine.

Exclusive Qualities of Red Head Plugs.

What is claimed to be a superior spark plug because of exclusive qualities of design and construction is produced by the Red Head Spark Plug Corporation, with offices at 261 Broadway, New York City, and factories in New York and at Newtown, Pa. This concern acquired the patent rights, material and general assets of the concern that formerly manufactured Red Head spark plugs.

In the production of this plug exceptional care is taken that it will measure up to mechanical and electrical standards, and the parts and the assembled plugs are subjected to inspections and tests that are regarded as being certain to detect defects of materials and faults of workmanship.

The corporation was organized to take over the business after very close examination had been made of the company's patents and the quality of the products that were practically productive under them had been established. The concern planned to largely increase the manufacturing facilities and better develop the processes of production, and to broaden and increase the scope of its sales department.

The company now operates two factories, that at New York City being given over to the production of plugs from materials manufactured in it, and the other at Newtown, Pa., where the insulation cores that carry the central electrodes are produced. The cores or insulators are made from a combination of clays imported from France, England and Belgium, and these materials are combined in proportions that have been found by innumerable experiments to have qualities that are claimed to be superior to any other type that is made. The insulators are maintained to be a synthetic stone that has a structure that differs entirely with that of porcelain and will endure the very wide changes of temperature and the vibratory stresses of the engine without fracture. The insulator material is known as Vitristone and the name is registered in the United States patent office.

Statement is made that this insulator is greatly superior to any other and that its endurance is far greater than any porcelain insulator made; that because of this endurance the life of these spark plugs is measured by years and a defective insulator is almost unknown because of the methods of manufacture and the care taken in testing and inspecting them.



Seating the Gaskets Between the Core and the Shell and Bushing—This Is Done by Hand to Obtain a Perfect Seat Without Stressing the Gaskets.

How Plug Insulators Are Made.

The process of producing these insulators is very interesting. The clays are mixed and in the slip house the mixture is passed between a series of magnets of such strength that all particles of iron are drawn from it, so that it is perfectly free of what might be conductors of electricity. The mixture of clays is then taken to the "throwing up house," where it is formed into what are known as "biscuits," which are pieces of the compound having cylindrical shape.

These "biscuits" are then given a rough turning in a machine that forms the collar or largest diameter and the two upper and lower diameters, and bores the hole through the center for the electrode. The pieces are then dried from 60 to 70 hours at room temperature, after which they are again turned in automatic machines that reduce the diameters to exact dimensions and finish the bores, and complete the "petticoat" or enlargement of the bore at the base of the insulator.

Kiln Firing a Long Process.

The pieces are again dried at room temperature for a considerable period



Inspecting the Plugs After Final Assembly and Test and Adjusting the Points of the Electrodes by Gauge to Be Certain of Positive Functioning.

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and then are placed in "saggers," or carriers, and are put into the kiln. The kilns have capacity for about 40,000 insulators for each firing. When the insulators are put into the kiln from four to eight test pieces are placed in different openings and by the effect of the heat on the test pieces the progress of the firing is determined. The test pieces are in the form of cones and these will gradually assume shapes by which the firing is judged. The kilns are fired with a special coal and the temperature will reach 3800 degrees Fahrenheit. The firing must be carefully watched else the contents of the kiln may be destroyed and be reduced to what are known as "duds," or, if burned, to "nigger babies." From four to six days is required for a firing.

The insulators are removed from the kiln and after cooling are subject to the glazing process, the glazing material being sprayed on instead of dipping them into the compound. After the glazing the insulators are decorated, this being with red, and consists of the trade mark and a narrow band at the top. They are next placed in the decorating kiln and again fired, this setting the glaze and the decorations.

Tests for Electrical Defects.

Each insulator is then tested to detect possible electrical defects and carefully inspected to find cracks or porosity. The electric test is made with a temporary electrode and an extremely high voltage is used. Statement is made that no other manufacturer makes so thorough a test of insulators, most of them testing a few of each lot as it is going through the plants.

The insulator plant at Newtown is maintained to be the most complete and the best equipped of the kind in the country, and that it was constructed with the view of producing insulators for the Red Head Spark Plug Corporation, alone evidences the care taken to obtain quality. This plant is large enough to produce all insulators that can be utilized by the New York factory for a considerable period, and its capacity can be increased when necessary to meet any requirement.

At the factory in New York the insulators are again tested for breaks and porosity upon receipt, each being examined before work is done upon it. This is exclusive of test made of the spark plugs as they are later on assembled. The center electrodes are made of nickel manganese steel wire that is made to specification and is in two sizes, .075-inch for the standard sizes and types of plugs and .125-inch for the "Big Boy" plugs, the latter being designed for specially high powered engines.

Making the Central Electrodes.

The wire is cut into lengths and is threaded at one end for the standard sizes, but the wire for the "Big Boy" plugs is not threaded. Instead, at one end a short piece of steel wire of larger diameter is electrically welded, this shorter section being threaded. Where the two pieces are joined a collar or flange is formed that serves to anchor the electrode in the bore of the insulator and also seats at a point in the bore that locates it with reference to exact projection beyond the ends.

The electrodes are placed in the insulators and they loosely fit the bores. The space between the electrodes and the internal bores of the insulators is filled with a thick paste formed principally of pulverized flint and silicon soda. The paste is forced into the bores under a pressure of 50 pounds, the locations of the electrodes being determined by the operative, those of the "Big Boy" plugs being forced into the bores until the collars of the electrodes seat. The threaded portions of the upper ends of the electrodes extend into the bores and that part within the bores is covered with the paste. This forms a firm anchorage for the electrode.

The insulators are then dried at room temperature for from three to seven hours and they are then placed in racks and put into gas heated ovens in which they are baked for 24 hours, when the paste has become as hard and as enduring as the insulator, alhering to both the electrode and the insulator.

Shells, Bushings and Shell Electrodes.

Both the shell and the bushing are automatic screw machine products, being very carefully produced and submitted to double inspection to determine accuracy of workmanship, the requirements being very exact. The single shell electrodes of standard types and the three shell electrodes of the "Big Boy" plugs are what is known as a "fish hook" design, having a straight shank that is fitted into a bore in the shell and extending downward and curving upward somewhat in the form of a fish hook, the bend being considerably below the firing point. Claim is made that should oil be thrown upon the electrode it will drain to the lowest part and will not accumulate where it will close the circuit and prevent the "arcing" of the current between the two electrodes.

The shell electrodes are nickel manganese steel wire and are the same diameter for all plugs, .055-inch diameter. The electrodes of this type are formed and cut at one operation and the shells are drilled by jigs of a special type. The electrodes are fitted to the bores in the shells so they may be seated in them by hand. The assembly is by jigs and the electrodes are "staked in" in punch presses that so constrict the bores that there is positive metallic contact and the electrodes are firmly anchored. The cutting and forming of the electrodes and the "staking in" are all automatic operations.

Gaskets a Special Type.

The gaskets, top and bottom, are copper asbestos of special construction, being the French or enclosed type. In assembling the binding nut is screwed on to the center electrode, a soft lead composition washer holding it firm, and in turn the lock washer and the knurled nut. Then the insulator and the gaskets are placed in the shells and the bushings are seated loosely by hand. The plugs are then taken to benches in racks and each in turn is placed in a fixture and the bushing is seated by hand with a two-handled special wrench. The object of hand fitting the bushing is to obtain a perfect gas tight seat without crushing and destroying the gaskets, and this has been found only certain with hand work. The expert operator can determine precisely when the bushing and gaskets have been seated by the "feel" of the lever, which obviously is not possible when assembly is in any other manner. The bushing and shell will expand in ratio to the heat to which they are subjected and the insulator will vary but little with varying temperatures. The gaskets must be sufficiently elastic to contract and expand and maintain the perfect contact that will insure against leakage, no matter what the pressure.

Tests for Service Qualities.

The insulators are all tested for electrical conductivity and resistance to excessive voltage, and in the final inspection the perfect concentricity of the insulator to the bushing and shell is determined, after the complete plug has been tested for leakage with 150 pounds air pressure, for upon this depends very largely the endurance of the plug. The adjustment of the electrodes is to gauge, so that the spark gap will be uniform. All details of construction are up to the United States specifications.

When the plugs have been finally passed upon they are packed in cartons, a carton containing 10 plugs or 100 plugs, the metric count being adopted because of its greater convenience in keeping stock.

Statement is made that the company now has four times the space that was occupied by the factory of the Emil Grossman Manufacturing Co., which produced Red Head plugs and from which the patents covering the manufacture of these plugs was purchased.

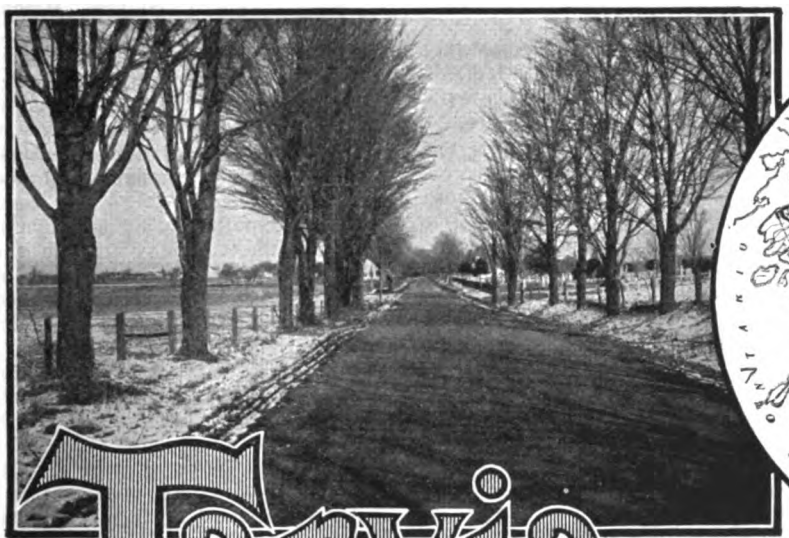
The Red Head Spark Plug Corporation has no connection with the former manufacturer, but is a new organization that will specialize spark plugs only. Because of its factory equipment and facilities it can make deliveries immediately. This is a fact of considerable importance to buyers.

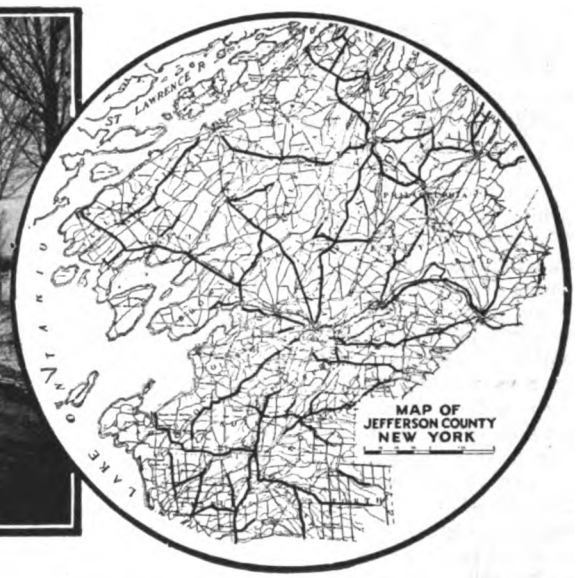
OVERHEATING.

Trouble from overheating sometimes comes from using old hose connections between the engine and radiator. Rubber hose when it becomes old has a tendency to loosen up between the layers of rubber and fabric. The inner lining is then likely to fold back when the hose is being replaced, covering the opening so that the flow of water is retarded. It cannot be seen from the outside, but makes itself evident in overheating the engine. In a similar manner pieces of the rubber will come loose and lodge where they cut off circulation.

One should keep the engine free from carbon in the summer and keep the valve push rods adjusted close, have the mixture as lean as possible and make sure that the exhaust through the muffler is free. Care in the things enumerated will give immunity from most of the overheating troubles, if not all.

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Tarvia

Preserves Roads-Prevents Dust

The illustration on the left pictures one of the Tarviated roads of Jefferson County, N. Y. The black lines on the map show the remarkable mileage of Tarvia roads in Jefferson County, N. Y.

—in Jefferson County, N. Y.

JEFFERSON County is solving the problem of low-cost, durable roads by the use of Tarvia and by co-operative action between the town and county authorities.

The towns provide machinery, tools, materials and labor. The county provides and applies the Tarvia. In addition, it makes a substantial money grant towards the cost of the improved road.

Maintenance costs of the new roads are adjusted on a "fifty-fifty" basis that is entirely satisfactory to both parties.

By this means, in less than three years 166 miles of modern, dustless, mudless, easy-traction Tarvia roads have been completed in this one county alone. These roads are water-proof, frost-proof and automobile-proof.

Mr. Henry S. Ball, County Superintendent, says these Tarvia roads "are in better shape today than when they were first built," and he sees "no reason why they should not last indefinitely." Mr. Ball is right because his experience is in line with that of users of Tarvia in every part of the country.

Doubtless this co-operative plan will be of interest to other highway authorities. If so we will gladly send full details on request.

Special Service Department

This company has a corps of trained engineers and chemists who have given years of study to modern road problems. The advice of these men may be had for the asking by any one interested. If you will write to the nearest office regarding road problems and conditions in your vicinity, the matter will have prompt attention.

New York
Chicago
Philadelphia
Boston

The Barrett Company

St. Louis	Cleveland	Cincinnati	Pittsburgh	Detroit
New Orleans	Birmingham	Kansas City	Minneapolis	Dallas
Nashville	Salt Lake City	Seattle	Peoria	Atlanta
Duluth	Milwaukee	Bangor	Washington	Johnstown
Lebanon	Youngstown	Toledo	Columbus	Richmond
Latrobe	Bethlehem	Elizabeth	Buffalo	Baltimore

THE BARRETT COMPANY, Limited: Montreal Toronto Winnipeg
Vancouver St. John, N. B. Halifax, N. S. Sidney, N. S.



Carthage-Antwerp Road, Jefferson County, N. Y.—a Tarvia highway.



The Carthage-Watertown Road—another tarviated highway.

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ATLAS TIRE CO. HAS MADE GREAT PROGRESS.

The Atlas Tire Co., 1777 Broadway, New York City, announces that it is selling tires as fast as it can make them, and is also getting a good share of foreign business. The company has made great progress. It started in business less than two years ago with one store in Philadelphia. A capacity business was reached almost at the start, and since then the company has been getting all the business it could handle. In Philadelphia the company did a wonderful business in rebuilt tires and seconds.

The company opened a store in New York City a year later. At present it has four stores in New York, two in Philadelphia and one in Chicago. It is planned to open up at least 10 new stores within the next year, all of them in the South and Middle West.

The company's great success in the reconstruction of tires has been a vital factor in its growth.

PRESSMAN TIRE PLANS CHAIN STORES THROUGHOUT NATION.

The Pressman Tire and Rubber Co., Philadelphia, which was recently incorporated under the laws of Delaware with $3,000,000 capitalization, has already leased several units of its proposed nation-wide chain-store system for retail distribution of tires, including Boston, Baltimore, WilkesBarre, Pa.; Scranton, Pa.; Reading, Pa.; Allentown, Pa.; Easton, Pa., and Harrisburg, Pa.

Other branches to be opened in the near future include New York, Chicago, Detroit, St. Louis, Cleveland and San Francisco. The Baltimore branch is located at 15 Mount Royal avenue.

The company has purchased for $500,000 three properties, 250-52-54 North Broad street, Philadelphia, in the heart of the automobile district. The officers of the new corporation are: President, and general manager, Herman Pressman; vice president and sales manager, William J. Ryan; comptroller and office manager, G. W. Manwaring; director, R. T. Moyer; general counsel, Michael F. Donahue.

The Pressman Tire and Rubber Co., through contracts, controls the output of three factories, a total of about 700,000 tires annually. Negotiations are under way for the output of other factories. The activities of the company embrace the entire tire field.

The principal factories now turning out tires for the company include the Sebring Rubber Co., manufacturer of the Omar tire; the New Castle Rubber Co., manufacturer of the Liberty tire, and the Universal Rubber Co.

Arrangements are being made for the establishment of distributing branches in all the principal countries of South America. Because of its mammoth business the company is enabled to sell tires at unusually attractive prices. Its sales are made under liberal guarantees.





PANOL MAKES FINE POLISH CLEANER FOR AUTOMOBILES.

Car owners and garagemen who have not tried Panol, the polish cleaner, are invited to write to the maker, the Panvar Co., Inc., Bulletin building, Philadelphia, for a sample, which will be furnished for 25 cents. The company is so confident regarding the merit of its product that it has adopted the slogan, "A Try Means a Buy." The sample is liberal enough to permit a thorough test and a comparison with other polish cleaners on the market.

Panol, when used on automobiles, is a splendid dry wash, leaving a rich gloss free from dust-catching grease or oil. It makes scratches disappear and keeps the windshield clear. It is, as the maker states, "the soapless, greaseless way to keep your car everlastingly new."

Panol removes all grease and grime down to the original finish, and restores the original factory luster. The producer promises that Panol will leave "a clear surface, smooth as glass and dry as bone; no greasy surface; no milky smear." It is also claimed that Panol lengthens the life of woodwork.

Panol is also intended for use in households, offices, hotels and restaurants. The retail price is $1 per quart, $3 per gallon. It is applied with a soft cloth. On large surfaces a sprayer may be used. Panol contains no wax, no acids or alkali. It is known as "the oil with a thousand uses."

MOTOR CARS IN HYOGO.

The number of motor cars in the Hyogo prefecture of Japan in 1918 was four, in 1912 there were 14, in 1916 there were 89, and at the end of 1918 there were 282 cars registered. The city of Kobe, which is located in this prefecture, is said to have 182 automobiles.

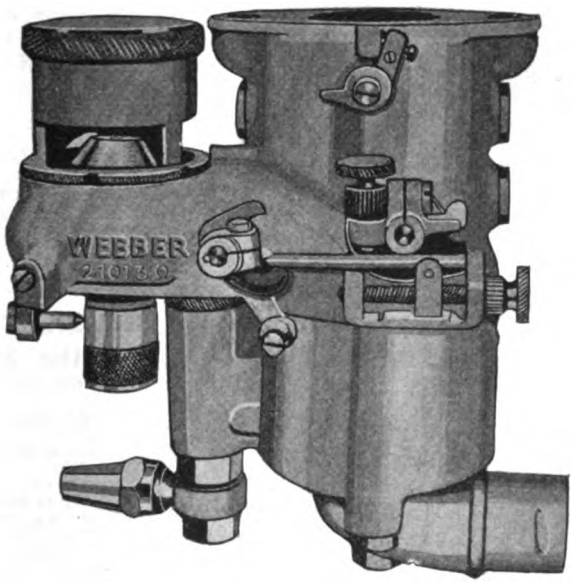
The Digest, published by the Motor and Accessory Manufacturers' Association, has adopted a new dress and policy and is aimed to be of greater service to the members. The July issue, comprising 12 pages, is crowded with interesting articles and features.

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WOULD YOU OWN A BALKY HORSE?

WHY OWN A BALKY AUTOMOBILE?

Install a WEBBER CARBURETOR



It remained for Webber to give you the last benefit, unheard-of flexibility, freedom from worry, with a minimum of expense.

Whether You Drive a Four or a Twelve

You don't know how different that automobile will run with a Webber Carburetor. Give your machine a treat and buy one now and notice the difference.

Satisfaction Guaranteed

Webber Manufacturing Co.

REAR COPLEY-PLAZA HOTEL

66 Stanhope Street Boston, Mass.

Agents Wanted for Open Territory

SPECIAL SALE—AUTO TIRES

GUARANTEED 4000 MILES

If a tire fails to give service of 4000 miles we will replace it with another tire for ½ price marked below:

Size	Plain	Non-Skid	Tube
28x3	$6.45	$7.45	$2.30
30x3	7.45	8.35	2.15
30x3½	8.95	9.95	2.40
31x3½	9.45	10.45	2.45
32x3½	9.95	10.90	2.50
34x3½	10.45	11.30	2.80
31x4	13.45	14.60	3.20
32x4	13.95	14.95	3.30
33x4	14.45	15.45	3.35



Size	Plain	Non-Skid	Tube
34x4	$14.95	$15.95	$3.45
35x4	15.45	16.95	3.55
36x4	15.95	17.50	3.60
34x4½	18.45	20.45	4.30
35x4½	18.95	20.95	4.40
36x4½	19.45	21.45	4.45
37x4½	19.95	21.95	4.50
35x5	20.95	23.45	5.15
37x5	21.95	24.75	5.30

Deduct 2 Per Cent. When Check or Cash Accompanies Order.
10% Deposit Required on All C. O. D. Orders.
We Carry a Full Line of New and Reconstructed Tires.

ATLAS TIRE COMPANY,

Tires and Tubes Shipped Express Prepaid

Telephone Poplar 2970

822 BROAD STREET, PHILADELPHIA, PA.

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44 COLUMBUS AVENUE, BOSTON, MASS.

SAVE 50%



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Quality Service for your car.

Starting, Lighting, Ignition.

One year guarantee on repairs and installations of all makes.

Everything pertaining to Auto, Electricity, Magneto and Generator Parts. We have one of the best equipped shops in New England devoted exclusively to this work.

BOSCH, SPLITDORF, EISEMANN, DIXIE, BERLING MAGNETOS and Parts Always in Stock.

Tires Guaranteed 5000 Miles

30x3 plain.....$10.00
Non-Skid $10.50
30x3½ plain.....$13.50
Non-Skid $15.00

Big saving on other sizes and tubes also. Trade in your old tires. 20% deposit required on C. O. D. orders.

Write for lists to

M. Liben & Co.

793 J 7th Ave., New York City.

IT'S EASY TO SAVE MONEY

It's only a question of knowing how. Save the difference between $40 and $16. The average tire that sells for about $40 would cost you about $16. Tires that you throw away or sell for junk we can retread them and you can get from 3000 to 4000 miles out of them, and some of them more. Now figure what you can save on your size. We can retread your old tire with any tread you desire for the prices quoted below. Send your tire in today and we send it back to you in three days.





Price List to Retread Your Old Tires

Size	Retread	Size	Retread
28x3	$8.00	34x4	$14.25
30x3	8.50	34x4½	17.00
30x3½	10.00	35x4	17.00
31x3½	12.00	35x4½	18.00
32x3½	11.00	35x5	21.00
31x4	12.75	36x4½	19.00
32x4	13.00	36x5	21.50
33x4	13.75	37x5	22.00

Add 10 Per Cent. Extra for Non-Skid.

We have a large stock of retreaded tires for sale. Add $1 to above list on the size you want and send your order. Mail orders given prompt attention. All orders accompanied by check or money order will be allowed 5% discount.

BOSTON AUTO TIRE EXCHANGE

304 COLUMBUS AVENUE, BOSTON.

—CLASSIFIED ADVERTISING PAYS—

Advertise the bargains that you have to offer.

8000 Buyers Read MOTOR TRUCK.

SERVICE AUTO-LITE STATION

BOSTON'S Finest Equipped Auto Electric Repair Service

With a staff of trained electrical men we can offer auto owners expert service, coupled with promptness and personal attention to all electrical repair problems. We also repair any electrical equipment used on a motor car.

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All Work and Parts Guaranteed.

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TIRES AND TUBES

Demonstrating and Factory Repaired.

Economy, Quality, Price. All Standard Makes.



Size	Tires	Tubes
30x3	$5.00	$1.35
30x3½	6.00	1.45
32x3½	6.50	1.50
31x4	7.25	1.65
32x4	8.00	1.60
33x4	8.75	1.70
34x4	8.75	1.70

No Junk. Satisfaction Guaranteed.

Size	Tires	Tubes
36x4	$9.00	$1.75
34x4½	9.25	1.75
35x4½	9.50	1.80
36x4½	9.75	1.85
35x5	10.50	2.00
37x5	11.00	2.20

Write for Prices on Odd Sized Tires. TERMS: $1.00 deposit with each tire ordered, balance C. O. D. subject to inspection. Specify style of rim to avoid delay. Although used tires are not guaranteed for any definite number of miles, **we guarantee our tires** to give the best service in proportion to the prices paid, or reasonable adjustments are made.

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AFFA



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They stop the rattle in—
The Brake Rod Supports for 35c.
The Brake Rod Clevises for 50c.
The Spark and Throttle Rods for 25c.
The Steering Spindles for 50c.
They serve many other useful purposes and are inexpensive.

JOBBERS, DEALERS, write for prices and folder which mean money for you.

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Skillfully Done. Assured Satisfaction. Prompt Service.

The repair work turned out of this shop is of the highest merit—because I know how. If you have electrical and magneto troubles, no matter whether it is a

BOSCH, SPLITDORF-EISEMANN,

or any other make, I can fix them. My well-appointed plant, coupled with skilled workmen, assures you of expert magneto service. Send in your magneto. 24-hour shipment.

Rebuilt Magnetos, Platinum Parts, Generator Brushes, Bearings, Etc.

Correspondence Invited.

The Magneto Shop

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FORD OWNERS—Buy a safe T first Rubber High Class Coil Box Protector—only $2.00. Save $20.00 damages on a rainy day. Big profits for agents, jobbers and dealers.

SAFE T FIRST GASKET CO.,
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Motors	$25.00 up	Presto Tanks	$ 4.50 up
Magnetos	4.00 "	New Spotlights	2.00 "
Carburetors	3.00 "	Generators	10.00 "
Rear Axles	15.00 "	Gears	1.00 "
Front Axles	5.00 "	Bearings	1.00 "
Cylinders	5.00 "	Radiators	10.00 "

$12 Diamond Bumpers.....$5.50

Jobbers in Bankrupt Auto Supplies.

BRIGHTMAN AUTO EXCHANGE
84 Wooster St., Hartford, Conn.

AUTO PARTS.
50% to 90% Off List.

24 Hour Service. Unlimited Stock.
Pope-Hartford, Columbia, Reo, Overland and 200 other makes.

Motors,	$20.00 up	E. Presto Tanks,	$4.00
Magnetos,	$3.50 up	B. Presto Tanks,	$4.75
Cylinders,	$3.00 up	Bearings,	50c up
Springs,	$1.00 up	Rims,	$1.00 up

1000 Other PARTS Bargains.

If you want any part not listed here, **Write Us—We Have It.**

Conn. Auto Parts Co., Inc.
1070 Main St., Hartford, Conn.

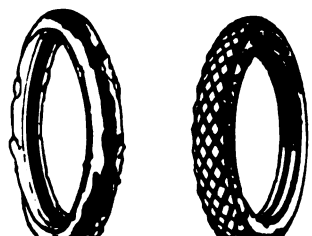
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883 BOYLSTON ST., BOSTON, MASS.

Official
SALES AND SERVICE
For New England.

Complete stock of parts always on hand.

Write for Price List.

BOSTON RETREAD TIRE CO.



Before **After**

OUR METHOD OF RETREADING IS DIFFERENT FROM OTHERS.

We use all Goodyear first quality stock and retread bands and can absolutely guarantee from **3000 to 3500 Miles.** We will replace a new tire for every one that our work does not give satisfaction.

Tires called for and delivered. We pay express charges one way on all out-of-town orders.

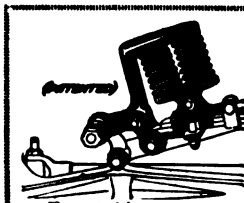
Price List Mailed Upon Request.

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SELLING AGENTS
for the N. F. G.
CARLISLE CORD TIRE.

Dealers write for our special proposition.

CAMBRIA TIRE EXCHANGE.
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Front Absorber

FOR FORD CARS. "Champion" Shock Absorbers. The perfect spring suspension. Absorbs all jar and rebound. Easy to attach. Fully guaranteed. Makes Fords ride as easy as any $5000 car. Ford dealers, agents and owners, this ad is worth $10 to you. Ask why. Write today.

Champion Shock Absorber Sales Co., Inc., Indianapolis, Ind., Mfs.

Auto Mailing Lists

Send for our free complete Price List covering Auto Dealers, Owners, Ford Dealers, Truck Dealers and Owners, Garages, Auto Mfrs. and etc., any state.

A. F. WILLIAMS, Mgr. of List Dept.
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H. Gordon, Ltd., 8a City Road, London, are open to take up the SOLE AGENCY of leading American Firms for

Light Motor Cars and Accessories, Motor-Cycles and Accessories, Leather Belting.

References: Messrs. Bowring & Co., Battery Place, New York City.

AUTO PARTS—At Your Own Prices. We can supply parts for nearly every make of car. 648 Packards, Interstate Fours, also Truck parts, GMC and other makes.

Write us for Parts. We have them.

STRANDWAY AUTO PARTS CO.,
193-195 H. St., South Boston, Mass.

Every Ford Owner Should Read "TRANSFORMING THE FORD." Tells how to secure smooth, positive brake action that no car can excel. A little "transforming" and your car will glide to a quiet, quick stop without the annoying, irritating clatter that you now experience. It will go into low or reverse without jumping or jerking and you can pick up speed with all the smoothness and ease of a high-priced car. All accomplished without additional expense and the result is a clear saving of 75 per cent. in one direction alone. "TRANSFORMING THE FORD" tells how it's done. Send for your copy this very minute. IT IS FREE. **Cormack & Co., 500 Fifth Ave., New York City.**

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Starters—
Generators—
Magneto—

We specialize in the repairing of all makes of Starters, Generators and Magnetos.

We offer prompt and efficient service. Our location and facilities assures the highest quality work and prompt delivery to all parts of the east. All work guaranteed.

New England Service Representative

Connecticut Ignition

All parts in stock. Parts list at request.

New England Sales and Service.

Dayton Starting—Lighting System for Ford Cars

V. A. NIELSEN COMPANY

708 Beacon Street, Boston, Mass.

DETROIT STORAGE BATTERIES
HAYES WIRE WHEELS

NEW ENGLAND SALES & SERVICE

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WE REPAIR ANY MAKE OF BATTERY OR WIRE WHEEL

For all Ford's $25.

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SELF STARTER PRIMER

5 YEARS GUARANTEE

IF YOUR DEALER DOES NOT HANDLE THEM WRITE US - 1777 BROADWAY NEW YORK

"UNIQ" RUNNING BOARDS

Eliminate that "TINNY" look from the Ford car

Every Ford owner who sees "UNIQ" Completely Assembled Wooden Running Boards is enthusiastic about having his car similarly equipped.

Not only do "UNIQ" Boards wonderfully improve the appearance of the Ford, but they are a much safer step, not slippery in wet or damp weather like iron boards.

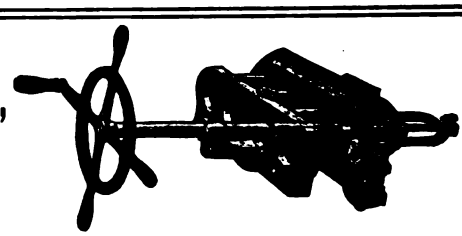


STYLE "A" LINOLEUM TOP, WITH ALUMINUM BINDING
Also Made with Pyramid Aluminum Top—Style "C."
Complete with set of Aluminum covered bolts for attaching.

EXTRA LENGTH "UNIQ" Boards can be had for any size extension commercial Ford outfits. Prices on request.

THE C. SPIRO MFG. CO., 68-70 East 131st Street, New York City

Repairmen, Listen!



Patented May 19, 1914; Dec. 15, 1914; June 20, 1916; June 26, 1917.

The Heiser Improved Cylinder Reboring Tool for FORD MOTORS is the only reboring Tool in the world that is self-sharpening. It is the only tool that rebores between centers—this insures a finished cylinder, square with the crankshaft, round, straight, true and free from taper. It is adjustable and the only tool that will rebore different sizes without losing the adjustment. **The best mechanic in the world can't build reputation without proper TOOLS and EQUIPMENT. THE HEISER IMPROVED CYLINDER REBORING TOOL makes good shops out of poor ones and better shops out of good ones. Write today for full particulars.**

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The Accessory and Garage Journal

$2 the Year, 20 Cents the Single Copy.

The only American publication devoted exclusively to the Power Vehicle and Allied Industries and Trades. A guaranteed circulation of 25,000 copies to trade interests only.

Address all communications to the

TIMES BUILDING

Pawtucket Rhode Island

C5 MFG CO

Giant Searchlight

The highest quality lowest priced lamp produced.

LIST PRICE With Mirror - $6.00
Without Mirror - $5.00

CULVER-STEARNS MFG. CO. Worcester, Mass. Detroit, Mich.

Agents:—To sell Factory Reconstructed Mileage Guaranteed Tires. Exclusive territory to good live wires. Excellent money making proposition to agents. Write at once.

ATLAS TIRE CO., 1777 Broadway, N. Y. City

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Exemplar
Tar and Road Oil Remover

A single application does the business. It loosens up and removes the most stubborn splotches of tar and oil—the stuff that does most to crack and kill the finish of a car. And there is nothing injurious or inflammable about it.

To give your car the "million dollar" look and keep it looking that way, use

EXEMPLAR

It washes, cleans and polishes

4-oz. Sample Bottle $ .25
1-qt. Size Can . . . $1.00
1-pt. Size Can . . . $ .60

Dealers:—
We have an attractive proposition for you on "Exemplar." Write for it.

AUTOMOBILE DIVISION

Pettingell-Andrews Company

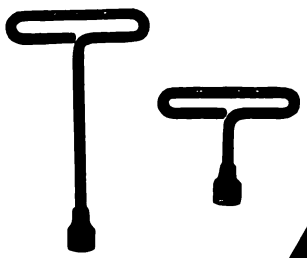
100 Brookline Avenue, Boston, Mass.

(When Writing to Advertisers, Please Mention the Automobile Journal.)

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MOSSBERG

ALL STEEL WRENCHES AND TOOLS

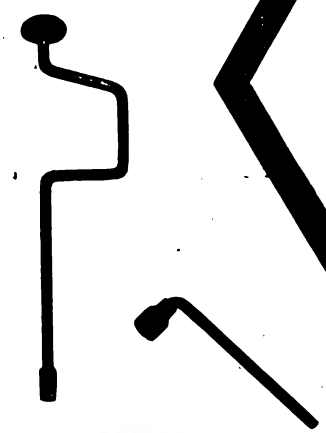


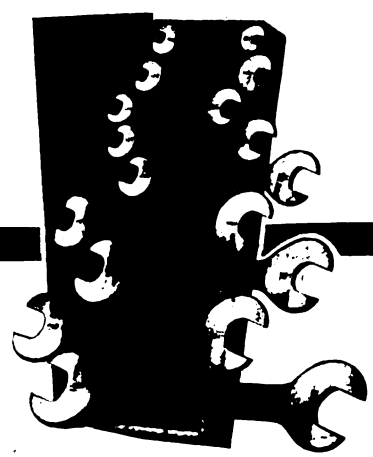
Leadership in the manufacture of tool equipment has been gained and maintained through adherence to principles of manufacture which insure to the user of Mossberg products the utmost in value and service.

Illustrated here are No. 4 Garage Set of Open-End Wrenches, with one opening of each when fitting U. S. Standard Bolts and the other opening of the same wrench fitting S. A. E. cap screws of the same dimensions; also solid handle All Steel Socket Wrenches, Speed Brace and Offset; and K-9 Adjustable Wrench.

Mossberg No. 600 Salesman of All Steel Tools for Fords, and No. H Salesman which contains a large assortment of All Steel Indestructible Socket Wrenches with large variety of sizes and fittings.

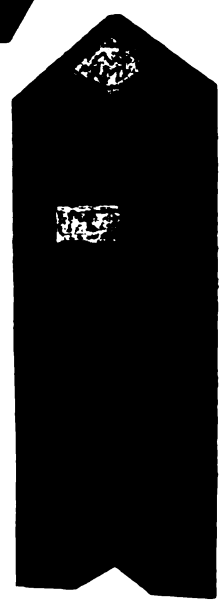
Send for complete 1919 catalogue and price list.











FRANK MOSSBERG CO.

WRENCHSMITHS FOR 20 YEARS

ATTLEBORO, MASS. U.S.A.

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Masters

AUTOMOTIVE ACCESSORIES

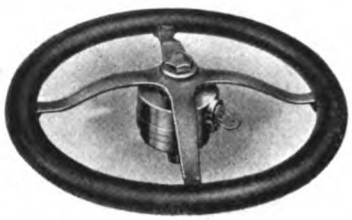
Absolutely Prevents the Theft of Your Ford

You don't need to be told that the Ford is the most easily stolen car in America. Every time you leave it for a few minutes it is at the mercy of thieves and joy-riders.

You try to protect it with insurance; but the policy won't buy the car back if it is stolen.

Foil the thieves! Lock your Ford so that it can't be stolen! Put on a

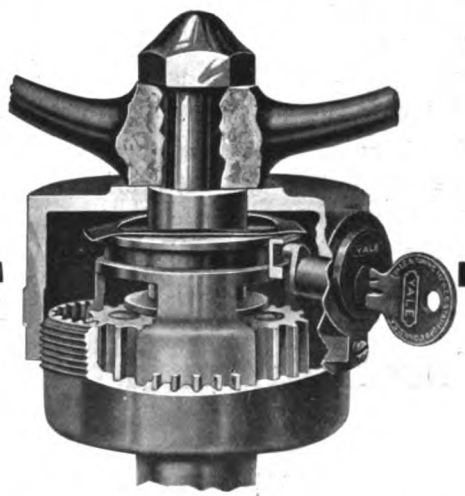
MASTERS STEAL-PROOF LOCK

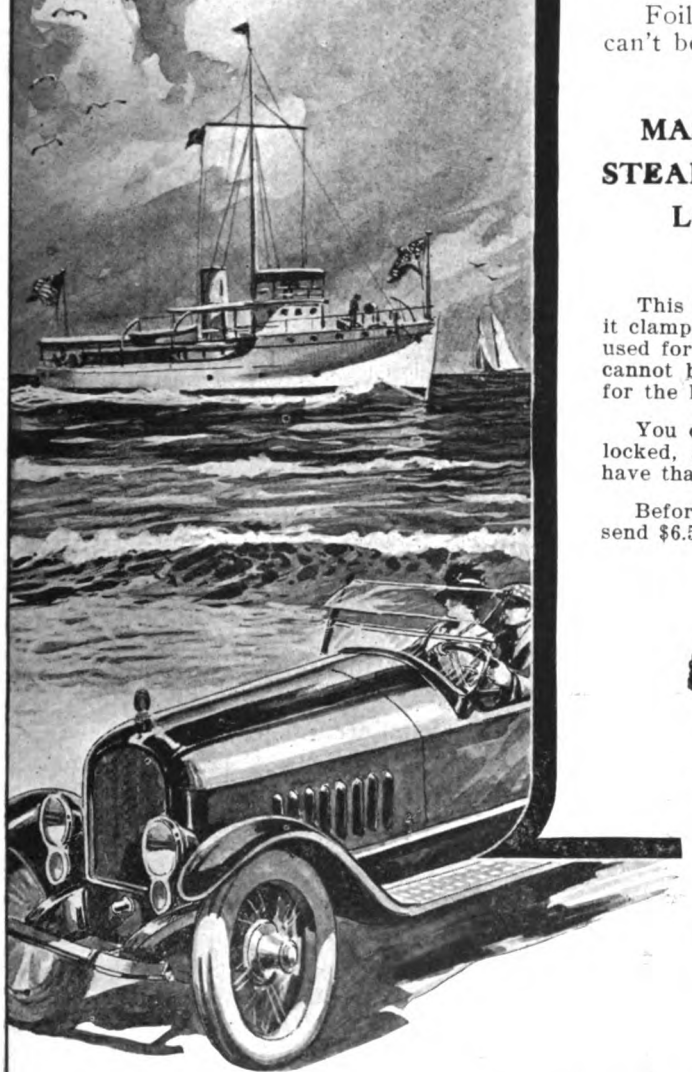


This lock is easily put in place on the steering post; it clamps the gears so that the front wheels cannot be used for steering. It cannot be picked—it's a Yale—it cannot be broken; it cannot lock the car accidentally for the locking bolt **rises** into mesh.

You cannot remove the key except when the car is locked, so that when the key is in your pocket you have that satisfactory feeling of security—it's locked.

Before it is too late, ask your accessory dealer or send $6.50 to Masters Manufacturing Company.





Masters Manufacturing Company

Woolsey Square, Jamaica Plain, Boston, Mass.

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BRUNSWICK Tires are built to supply the needs of every car owner. They are made in all standard sizes—cords with "Driving" and "Swastika" Skid-Not Treads—Fabric with "Plain," "Ribbed" and B. B. C. Skid-Not Treads.

Start with one **BRUNSWICK** today. You will soon use them for complete equipment. Put one Brunswick on record against any tire of whatever name or fame.

BRUNSWICK Tires are made for thoughtful drivers seeking greater all-around service and economy. Sold on a 5000-mile adjustment basis—you get more. The dollars you save by increased mileage will soon equal the value of a new set all around.

BRUNSWICK Tires assure you speed, comfort, safety, economy and easy driving.

Manufactured by

The Brunswick-Balke Collender Co.

Distributed by

THE BOOTH-LANGMAID CO.

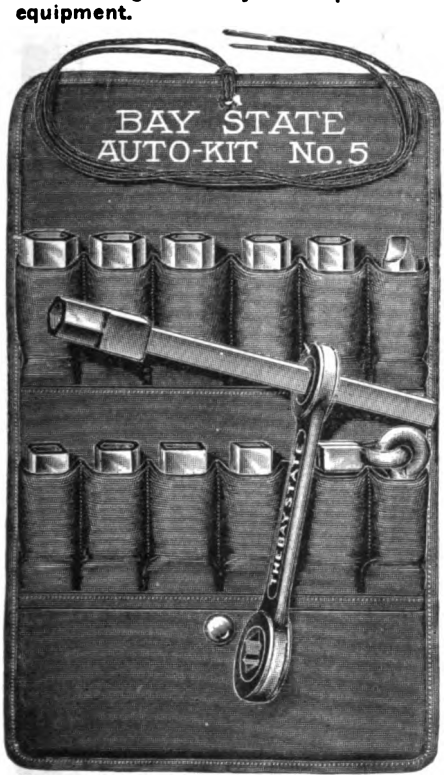
682 Beacon St., Boston, Mass.

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Sold by All Jobbers and Dealers

The specialties offered have been proven for their superior quality, utility and remarkable service-giving merits. They save and endure in any usage and have afforded full satisfaction. That is why the demand is universal, why they are stocked by the trade and the best guarantee that they have advantages that recommend their use.

Equipment made on a quality basis, designed and built by specialists, and produced to do certain work, must excell in efficiency. Every item represents the highest development possible to attain and this quality applies as well to material used, workmanship and finish. There is a decided and lasting economy in dependable equipment.



BAY STATE "AUTOKIT" SOCKET WRENCH SET NO. 5 FOR FORDS.

Ten heavy gauge steel sockets comprise this set, case hardened and as strong and tough as they can be made. Sixes, hexagon, square and oval, especially adapted for use on the Ford car, but carefully selected for use on any car or truck.

The set contains also a hardened steel screw driver, finely finished, universal joint, to reach the difficult places about an engine, seven-inch steel extension bar, double end ratchet wrench which fits all the sockets and the bar and which is reversible by simply turning it over.

The set is contained in a neat black cloth roll made of heavy drilling—not pantasote. The pockets in the roll are made to stand open when empty so that insertion of the parts may be quickly and easily accomplished.

List Price, $5.00.



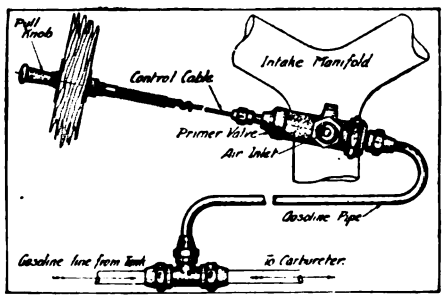
STICKIT "BAY STATE WRENCH SET."

This set is operated by a double ended ratchet wrench of the most convenient size for carrying in the tool box of the automobile or truck. The wrench will fit four sizes of nuts, and with the sockets 11 different sizes of nuts and cap screws. One end of the shank of the wrench has a 1¼-inch ball fitted to it, which is easily removed, while the other end of the shank has a ball catch, fitting flush with the side of the shank for holding socket wrenches securely in place. The extra sockets are very easily removed from the shank.

The set fits the following sizes of nuts and cap screws, the short diameter being given: Hexagonal, 1 5-32, 1 3-32, 29-32, 13-16, 23-32, 21-32, 11-16 and ½ inch. Square, 21-32, 11-16 and ½ inch.

Extra sockets any size desired are furnished at a moderate price.

List Price, $3.50.



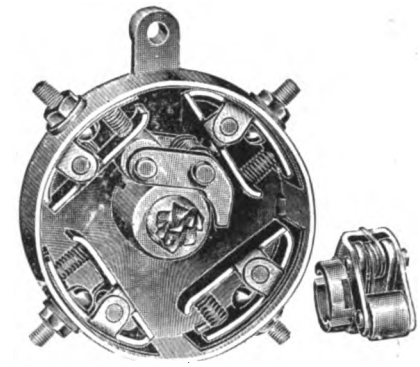
COPLEY PRIMER.

The Copley Primer embodies a new principle in primer construction and operates by the suction of the pistons in the cylinders of the engine. It is not a dashboard pump, but a permanent addition to the fuel system attached direct to the engine intake manifold.

It is the only primer using the carburetor principle of high velocity air to break up the gasoline into a thoroughly atomized explosive priming charge. This atomizing effect is obtained by using a venturi tube for the gasoline and air to pass through on the way to the manifold. Air is drawn in through a vent and check valve at the side of the primer. The gasoline and air rushing through this venturi tube is drawn into the choke portion of the tube and enters the manifold at high velocity, thoroughly aerized and atomized. As the primer is attached directly to the engine intake manifold, and operates only when the engine is in motion, there is no chance for condensation to take place, a common fault in many primers.

The Copley Primer by actual tests under most difficult conditions, starts the motor at the first touch of the starter button. Regardless of the weather conditions the motor starts instantly. This primer delivers to the engine a rich explosive charge of carefully determined proportions. The action is continuous as long as the primer is held open, making the primer automatic in action. This action is so perfected in the Copley Primer that the engine may be run continuously for short periods without assistance from the carburetor.

List Price, $5.00.



THE BAY STATE COMMERCIAL TIMER FOR FORD CARS.

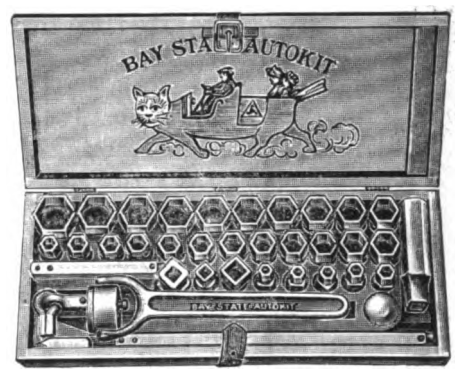
The Bay State Timer consists of a new contact principle, designed to overcome timer troubles and to produce more power, quicker acceleration, quieter running and much longer life in the timer than ever before possible. All contacts are made of high grade hardened steel.

A study of the cut will show that the construction is unusual and that the contacts are made by means of the usual roller and spring, contacts of a hinged type being employed, allowing a steel against steel contact all the way around and these steel parts are finished to a glass like hardness, insuring long life. It is needless to say that the wearing qualities will prove far more durable than the usual fiber construction.

In the Bay State Timer the arcing occurs at the bent ends of the contact—at a distance from the flat surface of the contact—where it can do no harm. Consequently there are no soft steel parts to burn or cause poor contacts. As fiber is not subject to wear in the Bay State Timer, none of the troubles caused by its usual use are present.

In this timer complete resilience of contact is obtained by making both the brush and the contact yielding. This construction results in smooth, even, quiet action, and in perfect adaptability to any eccentricity of the time shaft—a feature of utmost importance. A distinctive, efficient timer that affords distinctive and lasting service.

List Price, $2.50.



BAY STATE AUTOKIT SET NO. 1.

The Bay State Autokit No. 1 is a high grade set of 31 socket wrenches, with swiveling reversible ratchet handle, several extension shanks, a universal joint and a heavy screw driver. By means of the various combinations which these units make possible, it is easy to fit and remove any nut or cap screw on a car by a ratcheting motion. One long socket fits the spark plugs, which can in this way can be removed without danger of breakage.

The outfit is packed in a neat wooden box with each wrench in a separate section, pockets are also made for holding the extension rod, universal joint and spark plug wrench. The set occupies a small amount of space and is easily carried in the tool box of the pleasure car or truck.

List Price, $12.00.

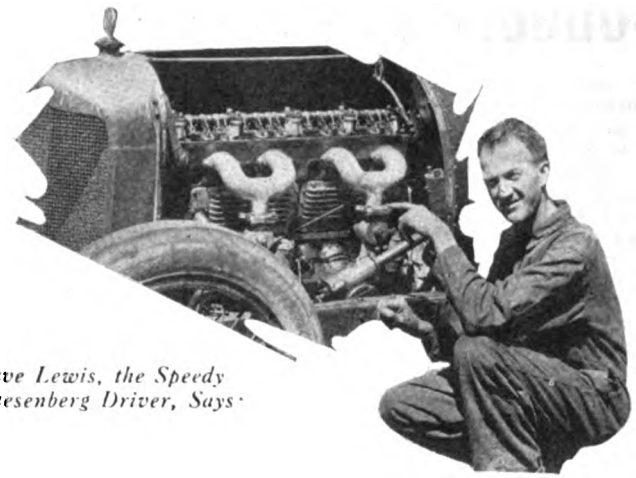
Sold by all dealers or direct

BAY STATE PUMP COMPANY

(Manufacturers)

1000 PURCHASE ST. BOSTON, MASS.

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Dave Lewis, the Speedy Duesenberg Driver, Says·

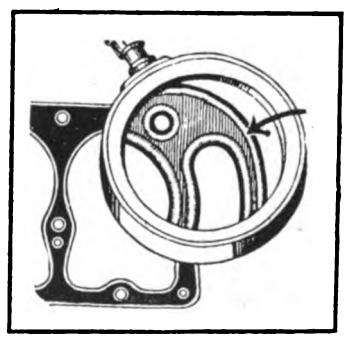
"It is the Greatest Power Producer and Gas Saver I Have Ever Seen"

The terrific speed of the Duesenberg-Meteor No. 38, driven by Dave Lewis July 4th, is in no small way the result of the perfect compression of this remarkable engine which was equipped with a Liberty Power-Plus Gasket.

This superior gasket is new. It is a revelation in gasket construction- the only cylinder-head gasket made that has the *seamed edge* which is an exclusive feature of ours. This seamed edge absolutely eliminates blow-outs, prevents compression leakage, makes the motor 10% to 20% more powerful, more flexible, more dependable.

Liberty Power-Plus Gasket now made only for Fords, Dodges, Maxwells, Chevrolets, and Overlands. With a "Power-Plus" installed you can take *any* hill *on high!* Ask your garageman—he has the Power-Plus for your car. Liberty Power-Plus Gaskets are made only by The Fitzgerald Mfg. Co., Torrington, Conn.

This is The Pierce-Arrow of gaskets. Made of finest copperized steel. Will not check, bend or break. Good for 25,000 miles—and more.



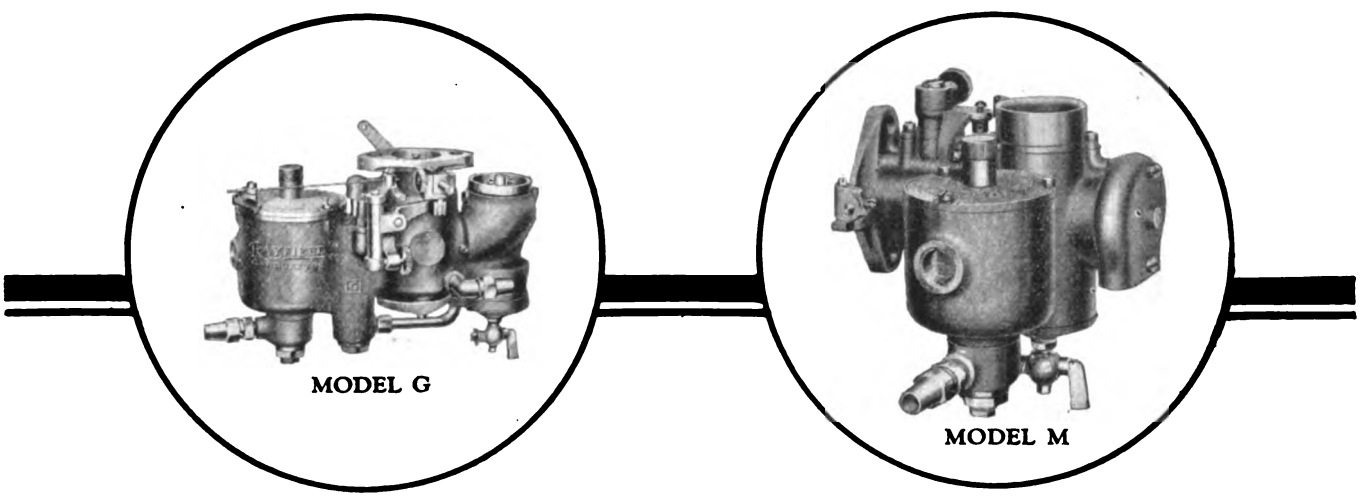
Note. The Seamed Edge' Old-fashioned gaskets may cost less but it's poor economy to have your motor only 50% efficient, get a "Power-Plus."

Liberty POWER-PLUS

A Radical Departure in GASKETS

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Rayfield Leadership Acknowledged by Engineers for Ten Years



Rayfield Carburetors have always been considered by the motoring public as representing the highest standards in carburetor performance.

There are sound reasons for this Rayfield supremacy.

Motorists have found that a car equipped with a Rayfield not only performs better but operates more economically over a period of months.

The big underlying reason for this performance is that in design the Rayfield is mechanically correct. It is this perfection which gives you more miles per gallon. It sends your car to the front in crowded traffic and carries it over hills and through sand without hesitation.

The Rayfield Carburetor at its price represents an unusual carburetor value. Dealers and car owners everywhere who have experienced a new satisfaction in motoring with a decrease in expense, constantly testify to the fact that Rayfield represents greater economy in the long run.

Distributors and Service Stations everywhere.

BENEKE & KROPF MANUFACTURING CO.
Successors to Findeisen & Kropf Manufacturing Co.
21st and Rockwell Streets, Chicago, Illinois

RAYFIELD CARBURETORS

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Without Apron



Apron Attached

APRON FOR FORD CARS

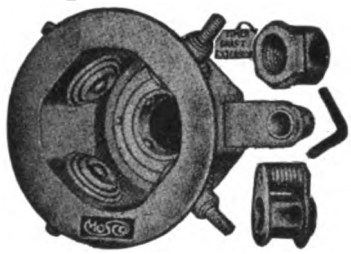
It adds greatly to the appearance of the Ford and gives a touch of refinement in design that makes it look like the more costly cars.

The Mosco Apron stiffens the fenders and eliminates the rattle. It is so designed that the air current is increased which adds to radiation efficiency.

Easily and quickly installed and made so that number plates can be attached. There is also a special device for holding the crank handle.

PRICE COMPLETE $6.50 Sold by all Dealers and Jobbers or direct

Improved Bemus Ball Contact Timer for Ford Car



Facts That Every Ford Owner Should Know

Easier Starting Grease Cannot Prevent Contact
Unbreakable Heavy Steel Shell
Smoother Running Contact is Positive
Longer Life No Fibre Ring to Wear Humpy

The **BEMUS** is an **IDEAL TIMER** for the **FORD** high speed, short stroke engine, because form of contact is the only one which is correct both electrically and mechanically. The brush comes in contact only with the four balls, touching no fibre or insulation. The balls are so located that each has a track of its own on the brush. The brush itself has been still further increased in diameter, and these two latter features combined will materially lengthen the life of wearing parts of timer.

MOUNTING is direct on the time shaft by means of an extension piece which is screw threaded on to shaft, and runs in ball bearing placed in recess of timer shell. This means that each of the balls is equi-distance from the brush. **RESULT**—absolute precision of timing.

STARTING—The chief cause of starting trouble in the **Ford** car is the presence of a body of hardened oil on the flat contact segments of the ordinary type timer, which prevents passage of current from the brush until continued turning has scraped off the grease. In the **BEMUS** the use of balls for contacts eliminates this source of trouble, as but little oil is used, and the balls cannot retain more than the slightest film on their surfaces.

PRICE COMPLETE $3.00 Sold by all Dealers and Jobbers

Motor Specialty Co., Waltham, Mass.

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Makes Any Ford A Perfect Riding Car

Completely absorbs all shocks. Controls the rebound, side sway and all chance of springs breaking

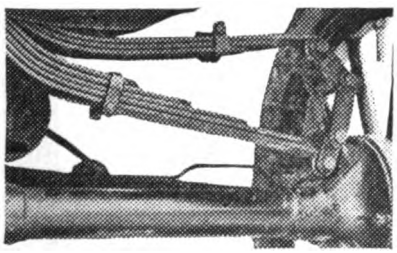


Easy to apply as any shock absorber. Anyone can do the work. 100% protection for Ford pleasure cars or trucks

The double action of springs is controlled by the opposite arch and suspension. Practical equipment that is guaranteed to afford full satisfaction in any service, not to break and made of the best alloy spring steel.

It greatly improves the appearance and makes the Ford look like a high priced car. For comfort, safety and efficiency it adds 100% to the service value and life of any passenger car or truck.

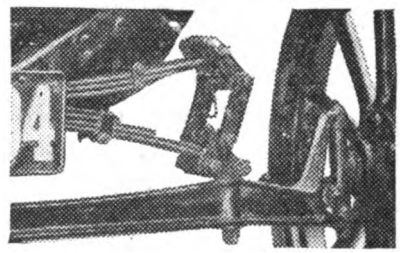
It Absorbs the Rebound or Upthrow



Rear View

By installing Beckman Springs the original spring on a Ford is lowered 2½ inches automatically. This action reduces the equivalent amount of spread on each side of the lower spring as well as the play in the steering. In other words, it improves the steering.

Approved by the leading spring manufacturers



Front View

YOUR FORD NEEDS IT

It stops the squeaks and rattles. These springs cannot dent or bump the body. Easy to clean and will last longer than the car. Our trial offer money back iron clad guarantee goes with every sale.

JOBBERS AND DEALERS:

This is car equipment of the highest quality, efficiency and service. Sells right and will prove to be a leader with you. Write for details and trade discounts.

BECKMAN METAL PRODUCTS CO.
409 SUPERIOR AVE. NORTH WEST
BECKMAN BLDG
CLEVELAND, O.

FORD OWNERS:

Save your springs and ride in comfort. Price $16.50 per set. Our guarantee protects you. Order from your dealer or direct. *Catalogue at request*

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A Quality Oil Victory

Won year after year against all competition in every test and under every possible working condition.

The saving to user amounts to colossal figures in money on the basis of more miles, less repair and upkeep costs, less wear and added service life.

It is one of the few motor oils that your jobber and dealer will recommend and guarantee. Just tell them the model of car you operate and they will be able to supply the exact grade that you should use. (There is a grade for every engine.)

They have it in sealed containers—the trade mark is your protection. Ask for it. Demand it. All good dealers sell it.

Do not gamble when buying oil—specify this brand. It costs no more than any other good lubricant, yet in more miles for a given quantity, with less soot and carbon, greater dependability and satisfaction, it is the most economical oil for anyone to use.

From 10,000 to 20,000 miles without engine trouble is common among users. The big real reason why you should use this oil is—sure, constant and better car service—for a greater period—at the least possible cost.

There is always something better, that is why

EAGLEINE OIL

has won on quality

An extremely interesting booklet of facts at request

Eagle Oil and Supply Company

44-46 INDIA STREET, BOSTON, MASS.

New York
Woolworth Building

Chicago
1132 West 37th Street

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REO

Eventually They'll All Follow Reo Leadership

IN CALIFORNIA where there are more motor vehicles per capita than in any other state—

IT IS ILLEGAL to drive a motor truck unless equipped with electric starter and lights and a windshield.

THOSE FEATURES that were first incorporated in a motor truck by Reo and which were flouted and ridiculed by others as superfluous, are now given recognition legally as well as morally and commercially.

JUST CONSIDER how the chances of accidents and consequent damage suits are lessened by electric lights on a motor truck.

EQUALLY PROTECTIVE to the driver is the electric starter—broken hands and wrists never threaten a driver of a Reo "Speed Wagon."

AND THE CLEAR-VISION, rain-vision windshield—also first applied to a motor truck by Reo—is also invaluable in protecting pedestrians and the driver and the owner against accidents in stormy weather.

WE HAVE OFTEN called your attention to the time-saving value of these distinctly Reo features.

BUT NOW the State of California has recognized their tremendous importance in its "Safety First" legislation by forcing less progressive makers to adopt these three Reo features.

OUR ONLY PROBLEM at this time is to get enough "Speed Wagons" to supply all who insist on having Reos.

NOTWITHSTANDING Reo is today the largest manufacturer of motor trucks in the world, still the supply is inadequate to meet the demand.

Reo Motor Car Company

Lansing, Michigan

"The Gold Standard of Values"

(When Writing to Advertisers, Please Mention the Automobile Journal.)

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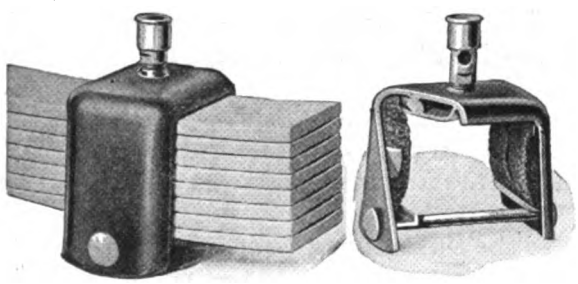
Do your springs squeak?
Does your car ride badly?
Does your car show undue wear?
What about upkeep and repair bills?

A squeaking spring is a constant menace. It is proof that they are dry and rusty. That soon the leaves will become frozen and then must break.
Safety, car service and comfort depends on the condition of the springs on any vehicle; yet no part of the car is given so little attention.
Springs must be lubricated if they are to absorb all road shocks and stresses. Otherwise they break and oftentimes with fatal results. Cars with dry and rusty springs deteriorate quickly and all the mechanism soon shows the effects of the sledge hammer blows that the springs, if properly lubricated, would absorb.

Springs a Potent Factor In Car Operation

BROWN SPRING OILERS

Will stop all spring squeaks. They will lubricate all bearing surfaces and the springs will not break. The car will ride easily and all undue wear on tires, chassis and body will be eliminated.



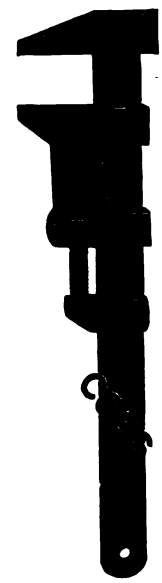
The illustration shows how the Brown Spring Oilers are made. How easy to attach. How and why it is so positive in action. It is made to slip over the spring and once placed it is bolted in position, filled with oil and requires no further attention aside from refilling the oil well. There is a size for every spring. It will last for years. It is a car necessity and an ever earning investment. It saves and always serves. The cost is moderate. It is car insurance of the highest quality.
Spring manufacturers recommend them. All jobbers and dealers sell them. They are sold with an ironclad guarantee of complete satisfaction in any service.

At request we will send a copy of the most interesting books on springs and care of the car ever written. It tells as well how to add to tire mileage and how to cut upkeep and repair costs to the minimum.

Complete information at request. Write for it today.

Brown Spring Oiler Company
6913 CARNEGIE AVENUE, CLEVELAND, OHIO

COES *The Standard WRENCH*



WRENCHES that are made for the hardest service. They do not break but grip and hold and their efficiency never lessens.
Economy tools as they last longer, give better service and never become useless through wear.
Utility wrenches of the highest order for car owners and repairers as they can be used in compact places and once set hold like a vise.

The Best Wrench The Cheapest

All dealers carry in stock the exact size to meet your need. They recommend Coes Wrenches as all good dealers have for more than fifty years.

COES WRENCH COMPANY
WORCESTER, MASS.

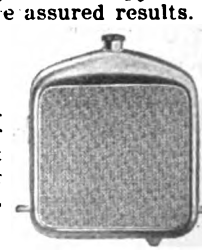
NATIONAL RADIATORS

NATIONAL ZIG ZAG RADIATOR *FOR FORDS*

National ZIG ZAG Radiators are more than just so much metal.
They are correctly designed, scientifically constructed, technically tested; radiators that have greater cooling capacity—unusual expansion and contraction flexibility. That means "plus" service.
They guarantee better radiation—added efficiency, besides adding wonderfully to the attractive appearance of a car.
Increased Driving Power Supplied—Less Gasoline and Oil Consumed—are assured results.

$28.00

F. O. B. Detroit. Finished in either nickel or black enamel. Shipping weight complete, 35 pounds.



Dealers

We are now in position to offer you an attractive agency proposition. Full information upon request.

Ask Your Dealer or Write Us Direct.

NATIONAL CAN COMPANY
DETROIT (Radiator Division) MICHIGAN

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OUR PATENTED CRUISER OUTFIT FOR FORD ROADSTER

Equipment includes tent, gasoline stove, spring, mattress, chair, camp stools, wash stand, table, bucket, axe and aluminum cooking utensils.



As it appears on the road with complete equipment.

CRUISER MOTOR CAR COMPANY
MADISON, WISCONSIN

DIXON'S GRAPHITE Automobile LUBRICANTS

Gears and bearings run more smoothly and last longer when lubricated with Dixon's Lubricants. They put an end to all lubrication troubles.

Also ask your dealer about Dixon's famous Cup Grease.

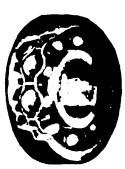
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Established 1827

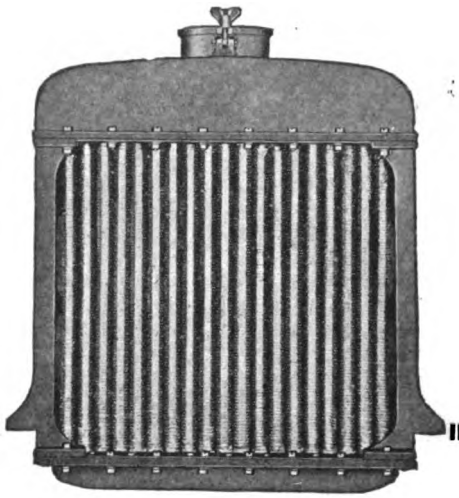
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Strength
Stamina
Service



The New Departure Manufacturing Co., Bristol, Conn.
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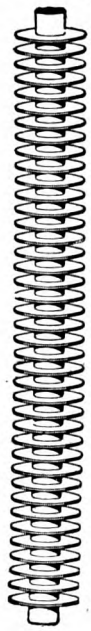


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by saving repair bills, loss of time and loss of service. The Radiator every Ford Truck Owner **needs**—simple—sturdy—strong. Practically freeze and boil proof. Thousands used by U. S. Government on Type B Liberty Motors. Standard equipment on many trucks of highest grade.

"As Sturdy As a Ford Engine"

"EMCO"
FORD TYPE
Truck Radiator



makes the Ford Truck 100% efficient.

SCIENTIFIC CONSTRUCTION

This Radiator is of fin and tube type. Each tube can be instantly removed and new one inserted, insuring prompt stoppage of any leak. Frame consists of malleable iron—capable of standing hardest usage.

Immediate shipments can be made—either freight or express.

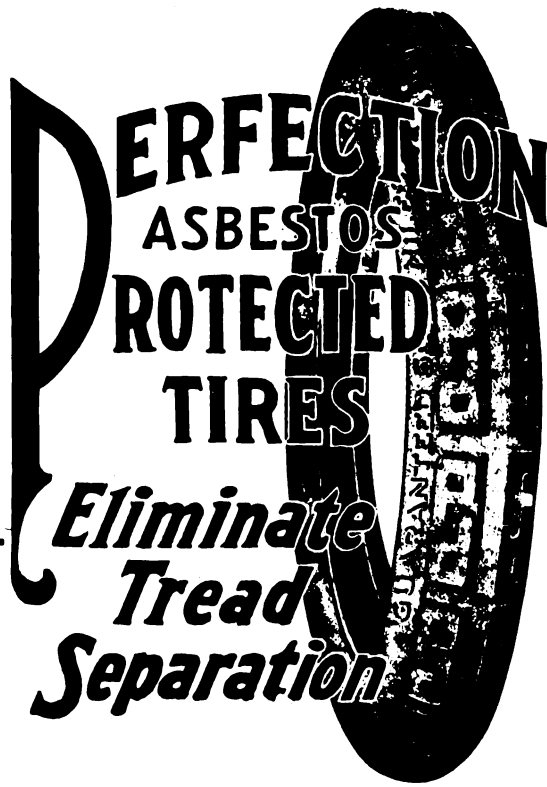
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The Emco Truck Radiator is a money maker and satisfaction producer for you. Write NOW for liberal discount plan. You cannot afford to disregard our attractive proposition. For full details, address

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They Greatly Outwear Their Guarantee

EVERYTHING honest and lasting that goes into other highest grade tires is used in the Perfection Tire, AND in addition an open-weave asbestos strip woven by us AND an extra ply of the strongest Sea Island Cotton AND our own special Rubber Compound.

The Asbestos protects the Cotton both against wear and against the high degree of heat needed for the thorough cure of the Rubber. This asbestos, soft as silk and tough as a steel spring, forms an inseparable union with the rubber in the curing process, making blisters impossible, making tread separation impossible—doing away with the twin evils which ruin other tires.

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A prime luxury at the cost of a staple necessity.

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Perfectly Made from Perfect Materials

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Save Your Axle Bearings

IN many cases live axle bearings have shown rapid depreciation from neglected lubrication.

NON-FLUID OIL

lasts several times longer in axles than common greases and cannot leak out of bearings, but gives perfect lubrication to the last.

Use NON-FLUID OIL in cups on steering knuckles and steering tube bearings—it lasts several times longer and helps to make the steering wheel responsive.

Try "KOO special" grade for gears, "KOOO" for all bearings. It comes in orange cans. Most dealers have it.

New York and New Jersey Lubricant Company
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$1120
F. O. B. Cleveland

Success and sales power spring from the conviction of value. It's ten times as easy to sell a car you believe in all the way.

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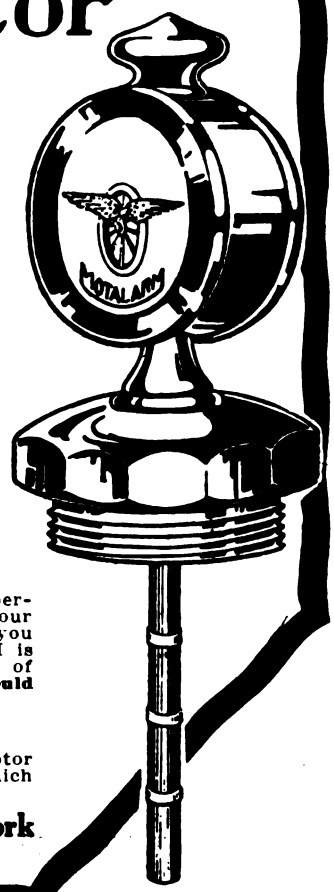
A Tractor Journal devoted to the tractor industry and trade

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The Watch Dog of Your Motor

Every minute you drive your car with the motor overheated bring you closer to the repair man and a big repair bill. When the supply of water in your radiator runs low, overheating is the inevitable result. With this condition comes the burning of bearings, cracking of cylinders, loss of power, backfiring and all the other costly and troublesome consequences. The way to avoid this—the way to prevent the water in the radiator from ever running too low—is to equip your car with



THE MOTALARM

"You Don't Have to Watch It"

This new appliance is unlike any radiator device ever put on the market. It does not merely show you when you are in danger from an overheated engine—**it tells you.** And it tells you in unmistakable terms by an insistent siren which can be heard in the noise of traffic or a heavy storm. Just as soon as the water runs low and the cooling system fails to function efficiently, the reliable MOTALARM gives you warning and keeps it up until the condition is remedied. But **the warning is given before the danger point is reached**—after the signal sound you can still travel without danger for thirty miles to a place where water may be obtained. This is the distinctive feature of the MOTALARM.

Requires No Attention

The beauty of the MOTALARM is the fact that you do not have to depend on your remembering to glance at it from time to time—you can forget it's there. The MOTALARM is your watch-dog. It is on guard every minute of the day; it pays for itself from the moment you first install it. **It serves also as a convenient water gauge at all times.** The MOTALARM is an attractive dignified radiator ornament which enhances the appearance of even the finest of cars. It is an absolute necessity. It is made to fit the radiator cap of all cars—**your car should be installed with it without any delay.**

PRICE $3.00 From most reliable dealers or direct from us.

DEALERS: The MOTALARM is sure to be one of the best sellers ever placed on the motor car accessory market. There is virgin territory ready for live dealers which will be allotted as fast as applications are received and approved.

THE MOTALARM CORPORATION, 1777 Broadway, New York

"Send Us More New York Automobile Replacement Coils at Once"

is the request of every Jobber and Dealer who have ordered previously



TYPE D

Unless you are already handling our REPLACEMENT IGNITION COILS you cannot realize the tremendous existing demand—they are not in the class of ordinary accessories. They must be procured immediately when coil troubles occur.

Fifteen years' coil building experience enables us to produce a coil that gives a crashing big hot spark, even when battery is low, which insures easy starting, perfect running and full power from present day gas.

No article ever supplied the automobile industry has proven more beneficial alike to Dealer, Jobber and user. We make a coil for every car, that is guaranteed for all time.

Circular showing how to order for each model car with prices and other information upon request.



TYPE A

NEW YORK COIL COMPANY

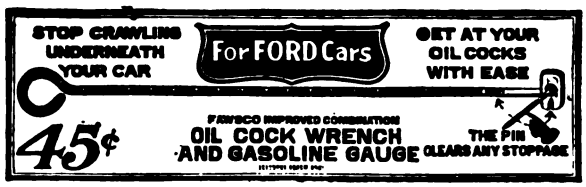
338-340 Pearl Street, New York, N. Y.

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USE A TOOL

A PATENTED WRENCH WITH CLEANING PIN

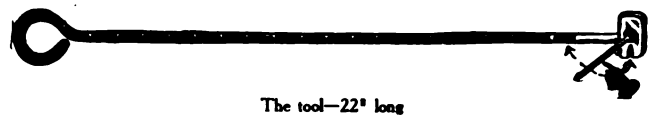


Facsimile of Display Card furnished with each dozen

A notched stick will turn an oil cock but it may be stopped up instead of empty. The cleaning pin is patented.

FAWSCO IMPROVED COMBINATION

OIL COCK WRENCH AND CLEANER AND GASOLINE GAUGE



The tool—22" long

This tool is the one most needed by all owners of Ford Cars, as it will not only accurately measure the Gasoline in your tank, but provides the only sure means of learning whether you have oil in the crank case or not.

Made of coppered Bessemer steel rod, nickel plated and black enameled and is guaranteed to give complete satisfaction.

Packed 12 in a heavy corrugated carton, one of them mounted on a display easel, the balance in separate envelopes.

Your Jobber can supply

Manufactured By

J. H. FAW, Inc.

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The Hotel Wellington

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NEW YORK

Located in the center of the Automobile industry, theaters and shopping districts, conveniently reached from all steamships and railroad terminals. The beautiful Central Park is within three short blocks of the hotel.

RATES

Room with use of bath, one person	$1.50 & $2
Room with use of bath, two persons	2.50 & 3
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Room with bath, two persons	3.50 & 4
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Parlor, bedroom and bath, three persons	6.00 & 7
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Special rates can always be arranged for extended periods on contract, and rates vary with the desirability of the quarters selected, the number of people in the party and the length of stay.

Operated under the Knott Management.

S. M. EATON, Manager.

PAIGE

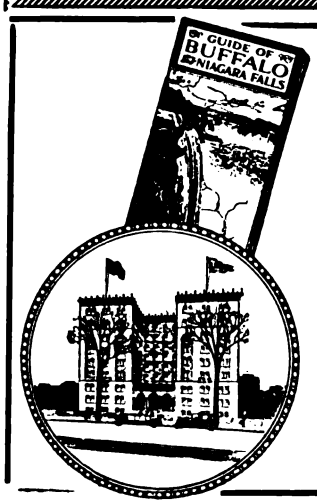
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A complete line of touring and enclosed models.

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DETROIT, MICH.



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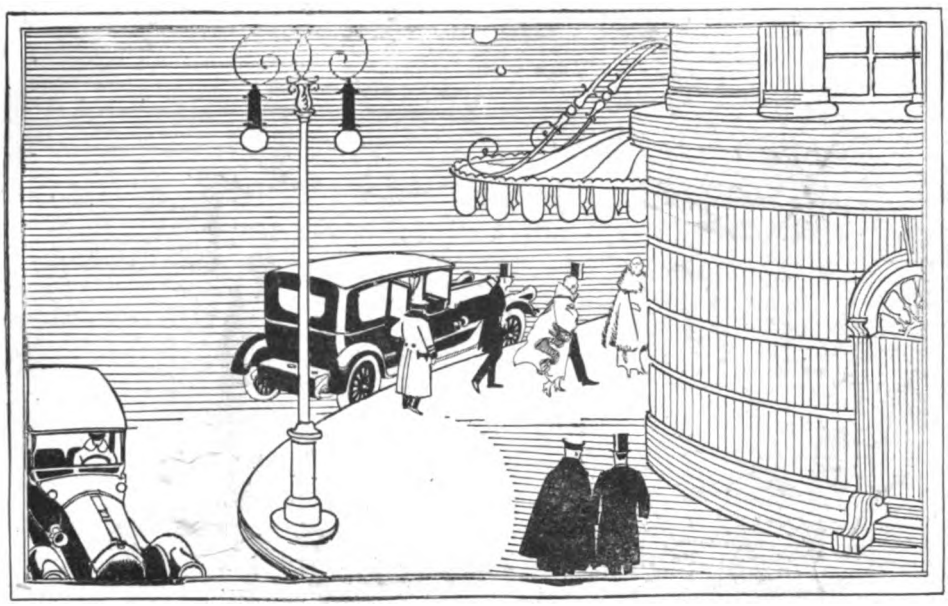
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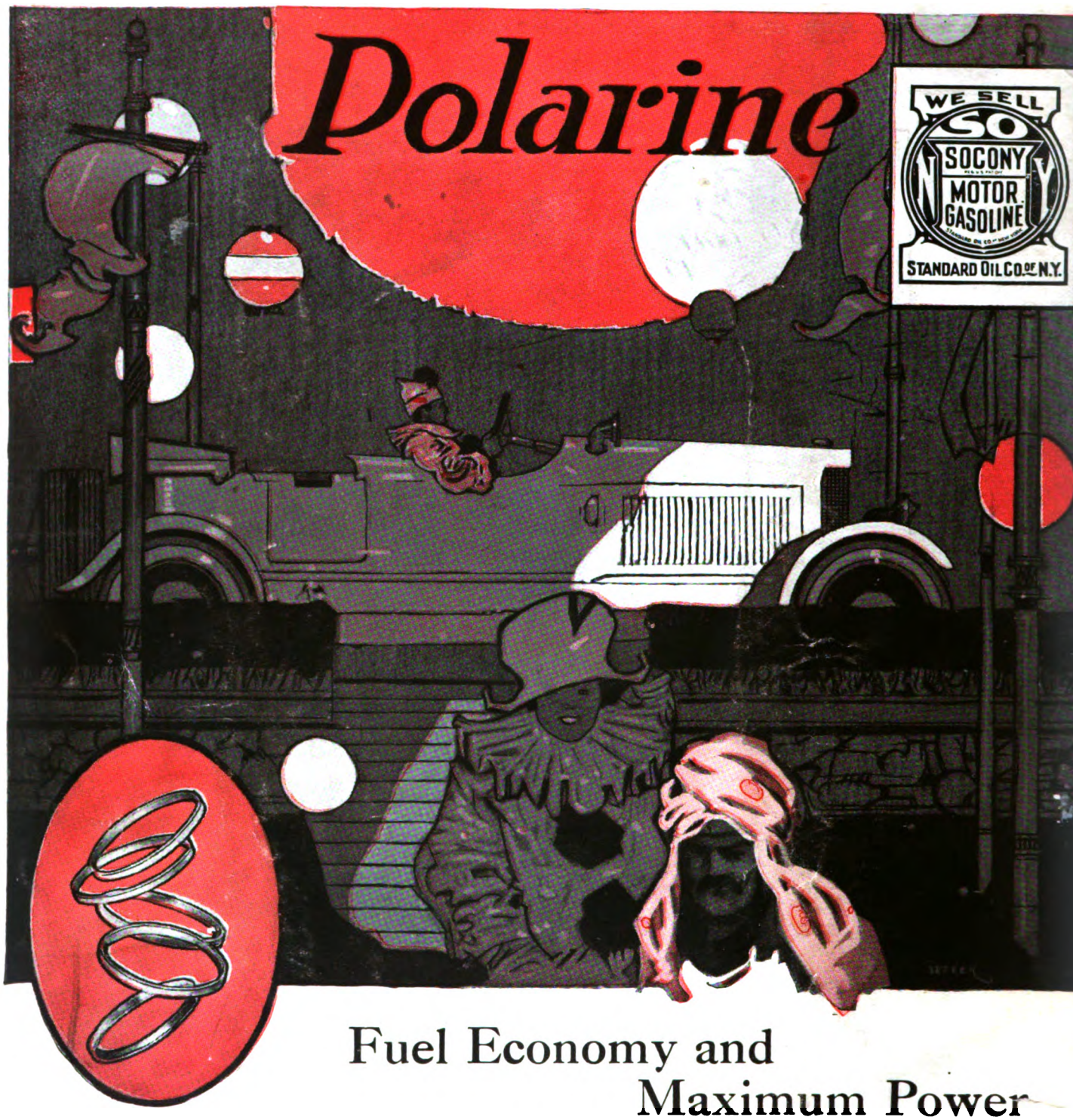


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THE keenest satisfaction that comes from owning things is to feel that the thing you own is of its kind a noted and noteworthy exemplar. A quality of the Pierce-Arrow is that no one is ever in doubt where to place it, whether he be the owner of the car or a bystander.

THE PIERCE ARROW MOTOR CAR COMPANY
BUFFALO, N. Y.

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Fuel Economy and Maximum Power

When the piston rings fit properly and **Polarine** keeps a tight seal between them and the cylinder walls, your car is spry and powerful. No fuel or power shoots past the piston rings. You get all the usable power out of every gallon of gasoline you buy.

Polarine insures the correct lubrication of crankshaft and camshaft bearings. Insures full compression because it does not break down and run thin at high cylinder heat and pressure. Keeps the engine free from excessive carbon—removes the necessity for frequent overhauling and repairs.

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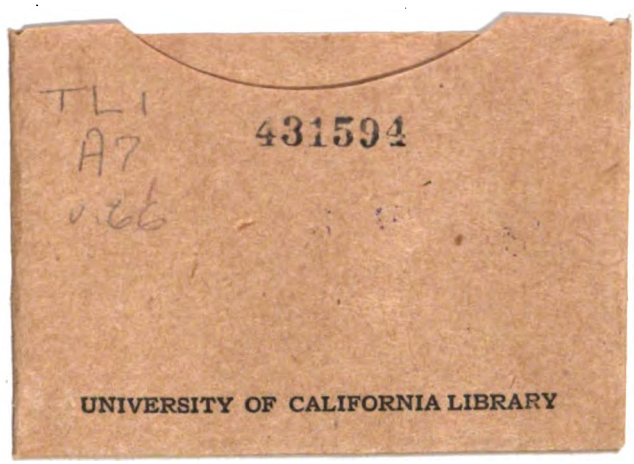
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